Remote Tracking Antenna Study (TAGGANT)

Scientific and Technical Report

(Final Report)

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INTRODUCTION

The final report includes the progress report for the months of October, November and December 1992. The main emphasis remained on packaging and improving the RF performance of an antenna/receiver for Satcom. Additionally, many other type of antennas were investigated. The following antennas were investigated and their data will be discussed in turn (note these are not in chronological order):

1. Letter decal antennas
2. Argos 90 degree bowtie antenna
3. Cellular bow tie antenna
4. Cellular bent monopole antenna
5. Antenna below variable aperture

1.0 LETTER DECAL ANTENNAS

A few letters were chosen at random to determine the feasibility of making antennas look like car window decals which actually operate at cellular telephone frequencies. The data in Appendix I looks promising although we simply did not have enough time to fully investigate this.

The three letters we chose were U, W, and N as shown at full scale in **Figure 1**. The VSWR's, antenna patterns and swept gains are shown in Appendix I. Although we chose the letters at random, the letter "L" would have been an important choice as it contains both vertical and horizontal components. Those other letters are somewhat directive (or directional) and have much better polarization isolation than expected. Also, note that this data was taken without the presence of ground planes. The remaining task is to pick a location on an automobile and a decal logo (LSU for example). It is also necessary to engineer ways to hide the feed and optimize the antenna pattern.

2.0 ARGOS 90 DEGREE BOWTIE ANTENNA

The Argos application requires an omnidirectional coverage for both polarizations at 401 MHz. Based on experience a 90° bowtie dipole antenna was chosen because of its simplicity and

low profile. Bowtie dipoles with a wide subtended result in both components of polarization. However, as the data in Appendix II shows, the polarization isolation is greater than desired. The full scale photocopy of the artwork of this bowtie antenna is shown in **Figure 2.**

There are two possible solutions to this issue. First of all the angle could be increased to greater than 90°. This would probably produce the desired effects with the exception of the nulls off the ends of the dipole for one polarization. The second option is to use printed cross dipoles which would solve the polarization issue but would still have nulls for one polarization off the ends of the dipoles of the opposite polarization.

3.0 CELLULAR BOWTIE ANTENNA

This antenna is a scaled version of the Argos antenna and is shown in **Figure 3.** The center frequency for this antenna is 880 MHz. The data is presented in Appendix III. Results are similar to the Argos antenna. A completely different approach is available as discussed in the following section.

4.0 CELLULAR BENT MONOPOLE ANTENNA

This antenna is shown in **Figure 4.** It is relatively low profile and requires only a small ground plane. The coverage of this antenna is very good in one hemisphere as shown in Appendix IV. The best orientation of this antenna is for the circuit board material to be horizontal. This will provide good hemispherical coverage and could be mounted on a car top or in a briefcase or suitcase.

The data shown in Appendix IV is for the antenna sketched in **Figure 4** without any additional ground plane. Also, note that this is a variation of the antenna that BCSD is mass producing for the commercial cellular telephone market.

5.0 ANTENNA BELOW VARIABLE APERTURE

In the Satcom band, we were directed (by HDL) to determine the effect of an aperture of variable size on an antenna of known performance. An Archimedean spiral (11 x 15 inch) was chosen as the candidate and tested in the presence of a variable size aperture. The data are presented in Appendix V. The following cases were tested.

Antenna Size	Aperture Size	Depth of Antenna Below GP
11" x 15"	12 x 16 (1" border)	1/8" and 1/2"
11" x 15"	13 x 17 (2" border)	1/8" and 1/2"
11" x 15"	14 x 18 (3" border)	1/8" and 1/2"
11" x 15"	16 x 20 (5" border)	1/8" and 1/2"

As can be seen from this table, for each aperture size the depth of the antenna below this aperture in the 4 ft x 4ft square ground plane was variable between eighth inch and half inch. The results of this test show that the depth below the aperture in the ground plane had little effect compared to the size of the aperture. The larger the aperture the less it disturbed the patterns and gains. The patterns of the antenna without the presence of any aperture are also included in Appendix V.

The gains of the antenna in the presence of the aperture are 2 dB lower for the 1-inch border case and about 0.5 dB lower (as compared to no aperture) for the 5 inch border case. Thus the size of the aperture has a relatively large effect on the performance. The data shows that the depth of the antenna below the aperture has only a minor effect.

6.0 REVIEW

This program began with BCSD (per HDL direction) focusing on GPS and cellular telephone antennas to be located beneath a vehicle or in a non-metallic bumper. Standard BCSD GPS antennas were tested at both GPS and GLONASS frequencies with good results (see Appendix I of the October 1991 progress report for complete data). Also bent monopole cellular antennas were built and tested. This included a single element as well a four elements and three element arrays (Appendix II of the October, 1991 progress report and Appendix I November, 1991 progress report respectively). Although suitable GPS and cellular antennas were designed, data on a vehicle was not ever taken as the focus of the program changed.

The focus of this program was shifted to designing and packaging antennas (in particular Satcom antennas) into a portable case. There were a considerable number of configurations built and tested before the final silhouette design evolved (see Appendices I-V of this report). Also, S-band Bifilar and Quadrafilar Helices were investigated for communicating with TDRSS

(Tracking and Data Relay Satellite System). This data is in Appendices 7 and 8 of the October 15, 1992 progress report. Additionally as described in this report, cellular telephone letter decal antennas development began with promising results. Wide angle bowtie dipoles for Argos (401 MHz) and cellular were also built and tested. Finally, to simulate a rooftop application, tests were performed with variables apertures and depths. These results are in Appendix V of this report, although it was determined that the larger the aperture the better the results.

The antennas that BCSD will deliver with this program are as follows:

Item	Quantity	Description
1	3	Letter Decal Antennas (Letters, U, W, and N)
2	1	Argos 90 degree Bowtie Antenna
3	1	Cellular 90 degree Bowtie Antenna
4	1	Cellular Bent Monopole Antenna
5	1	Bifilar Helix Antenna for TDRSS

Overall this program was quite successful. First of all, the development of Satcom portable antenna and case evolved extremely well. Secondly, a good solid base of data has been taken from which further development may be guided by. For instance, the letter decal antennas are a very promising ones to explore further. Also, adding other functions to the portable silhouette case is another possibility. Additionally, adding other antennas and receivers to other cases is realizable, BCSD looks forward to continuing development in these areas in the near future.

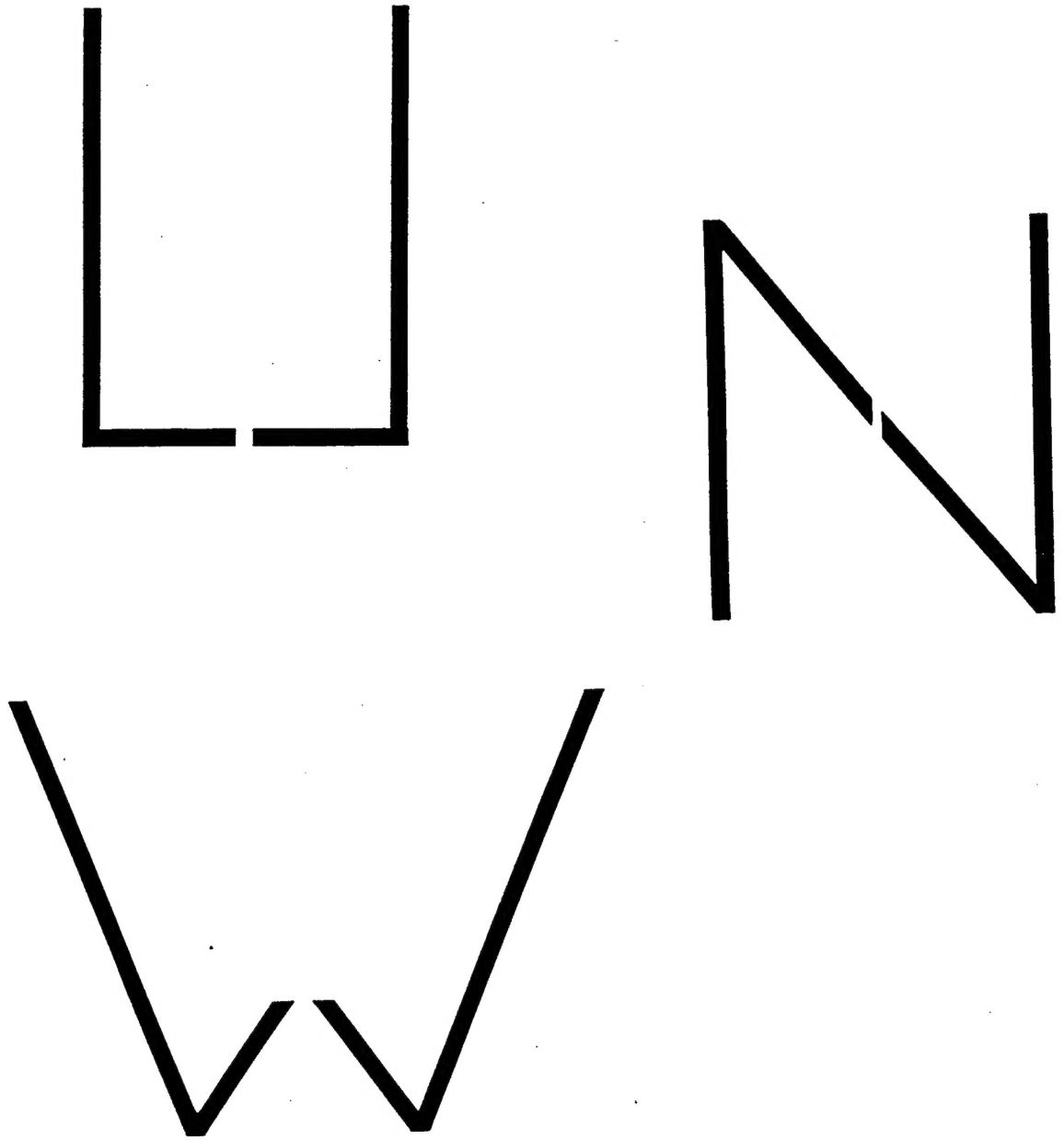


Figure 1. Letter Decal Antennas for Cellular Telephone (U, W, N)

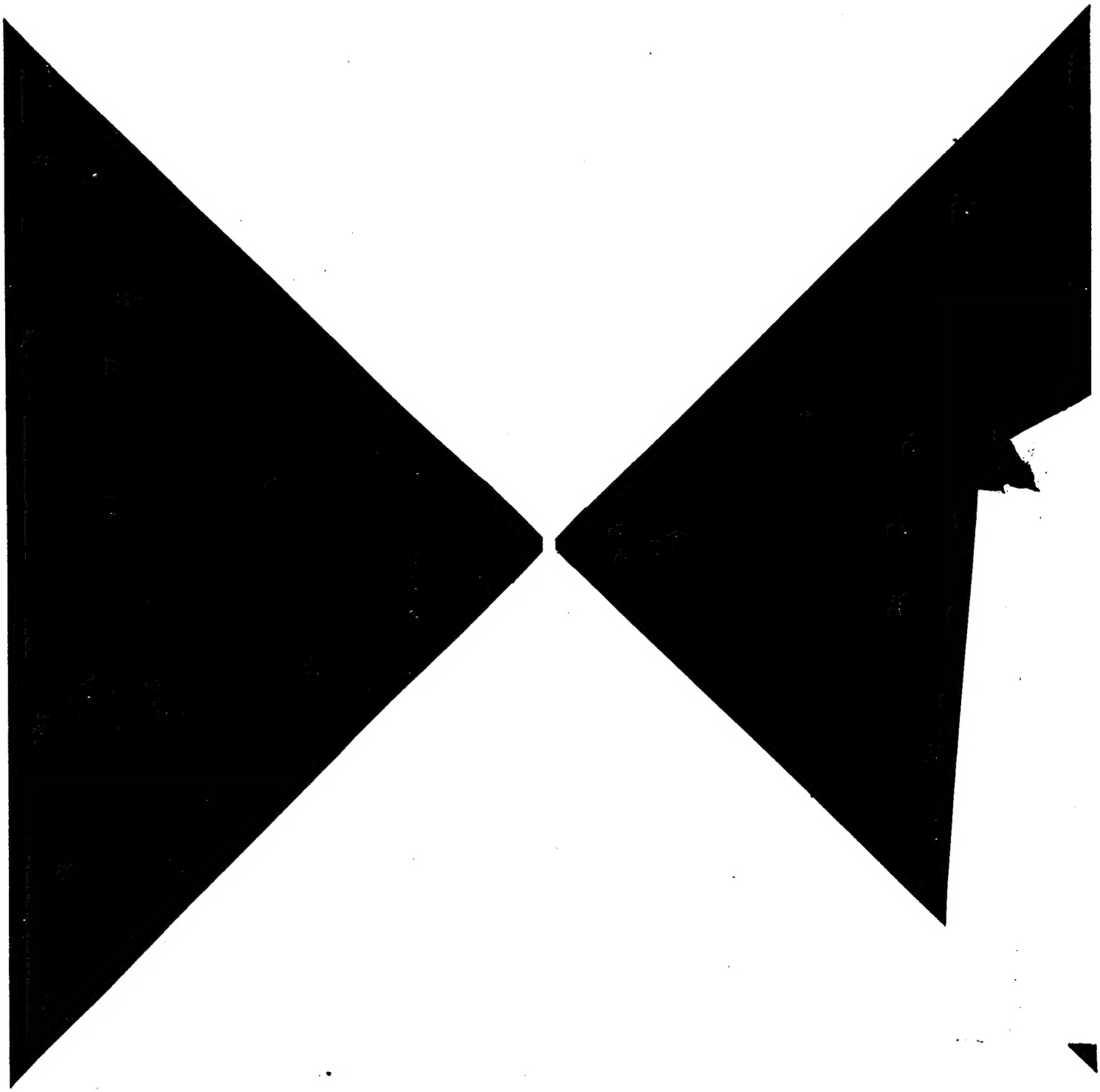


Figure 2. Argos 90° Bowtie Dipole Antenna (401 MHz)

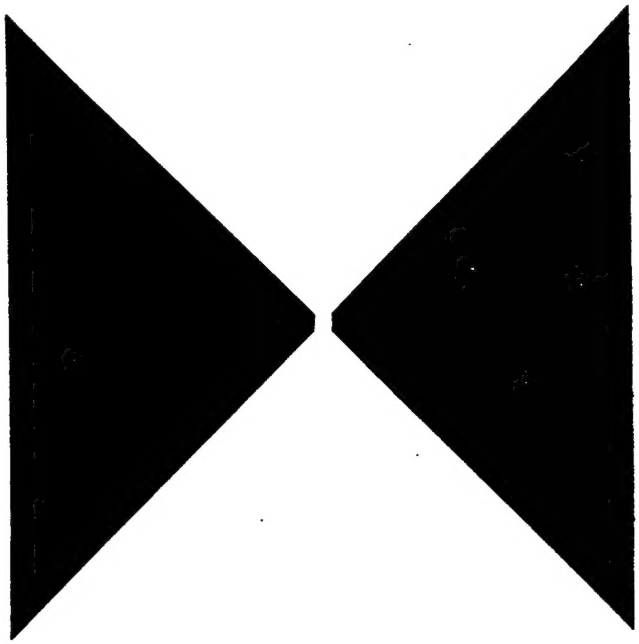


Figure 3. Cellular 90° Bowtie Antenna

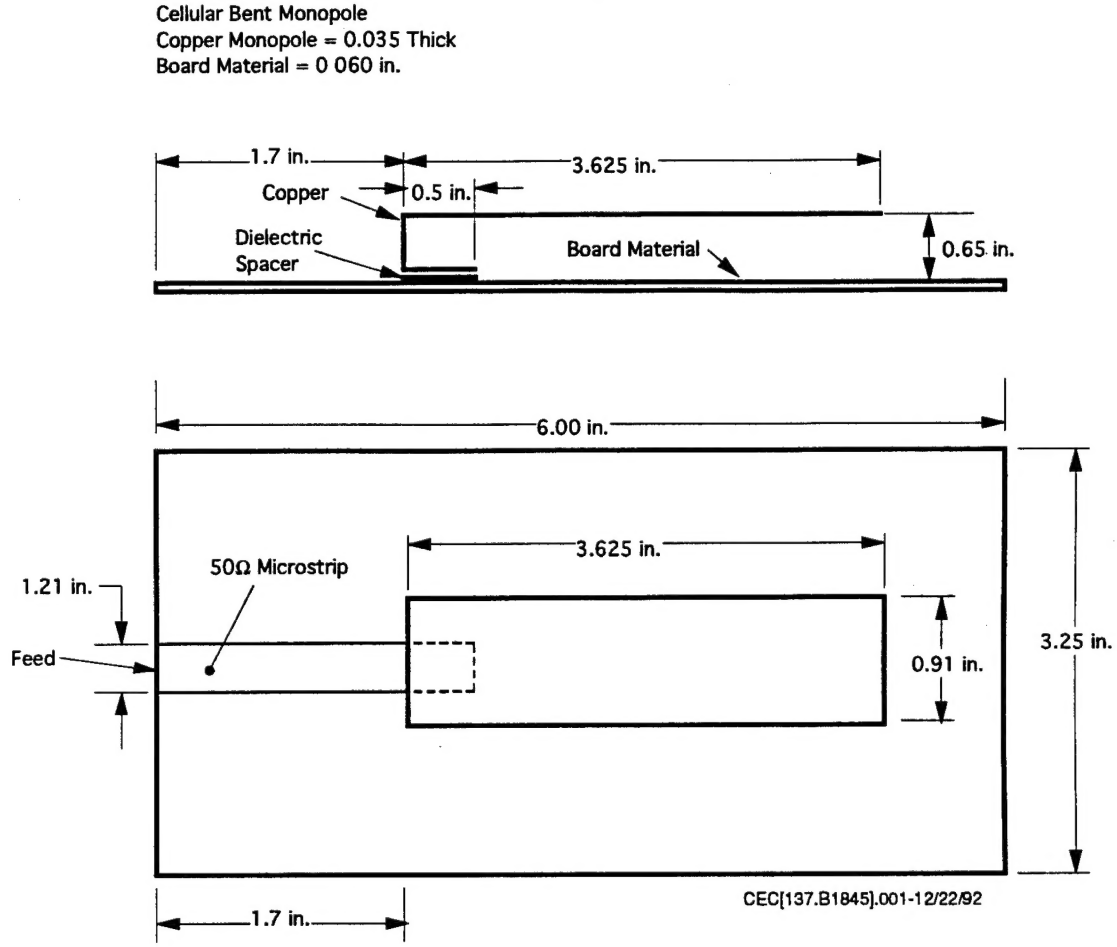
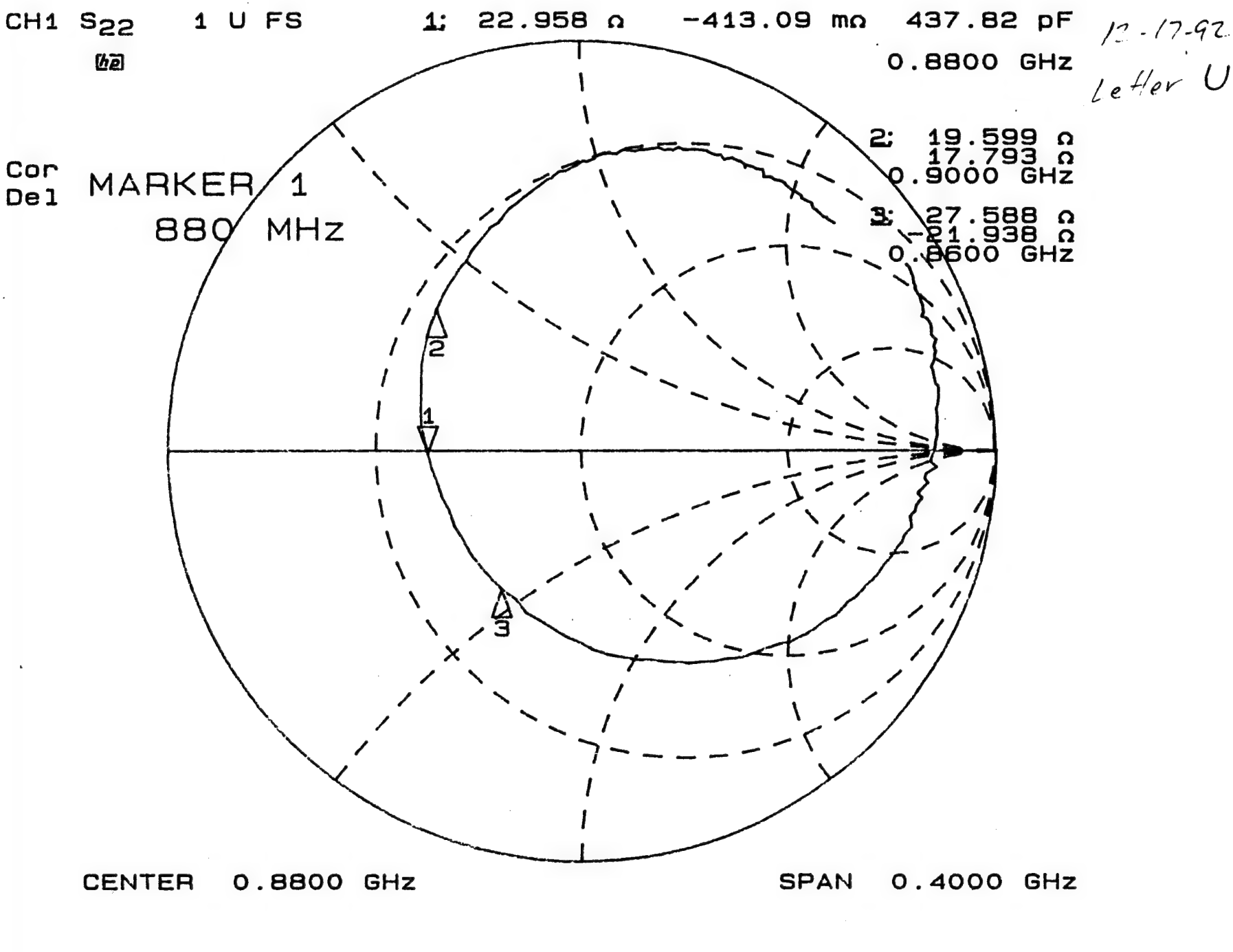


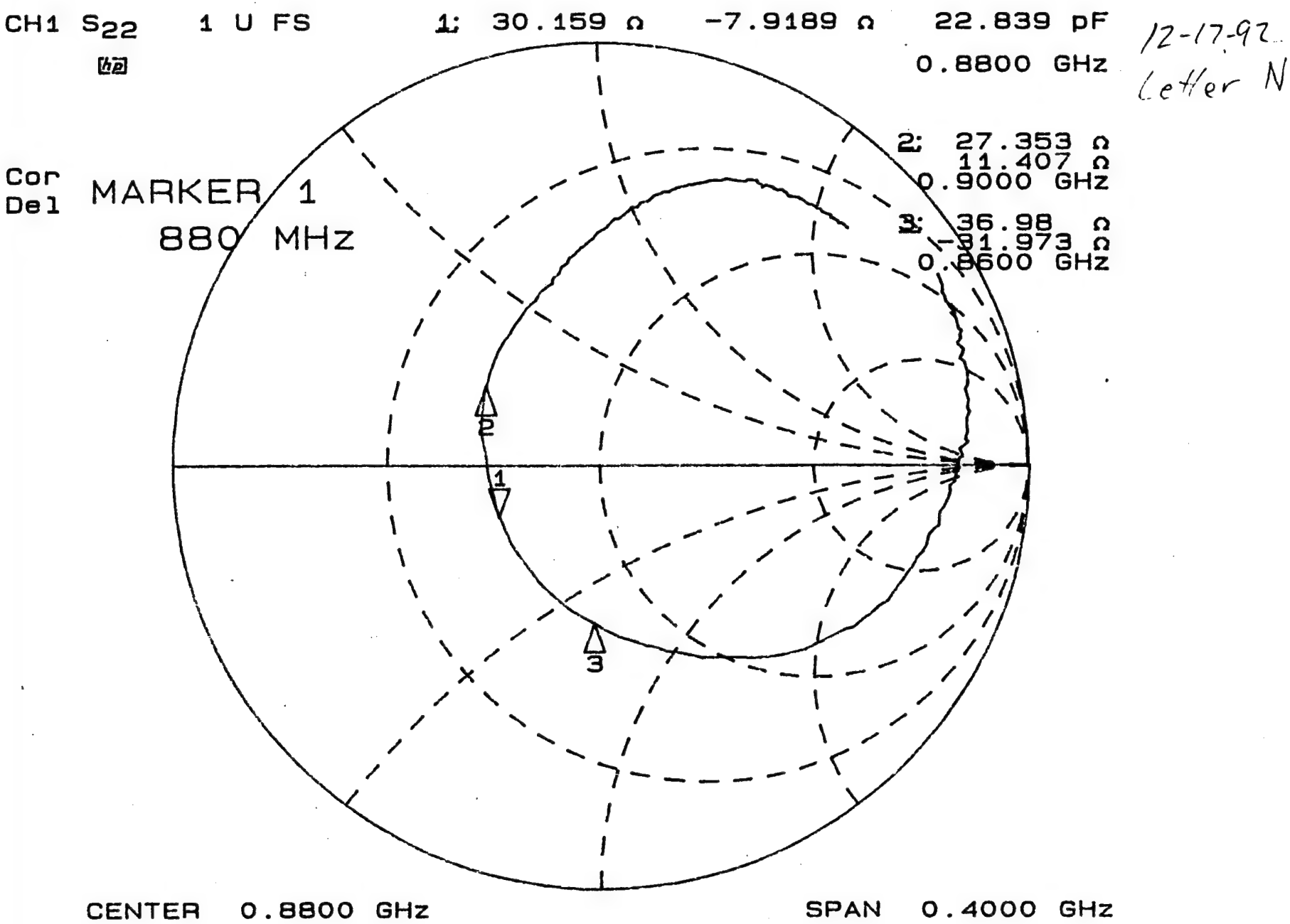
Figure 4. Cellular Bent Monopole Antenna

Appendix I

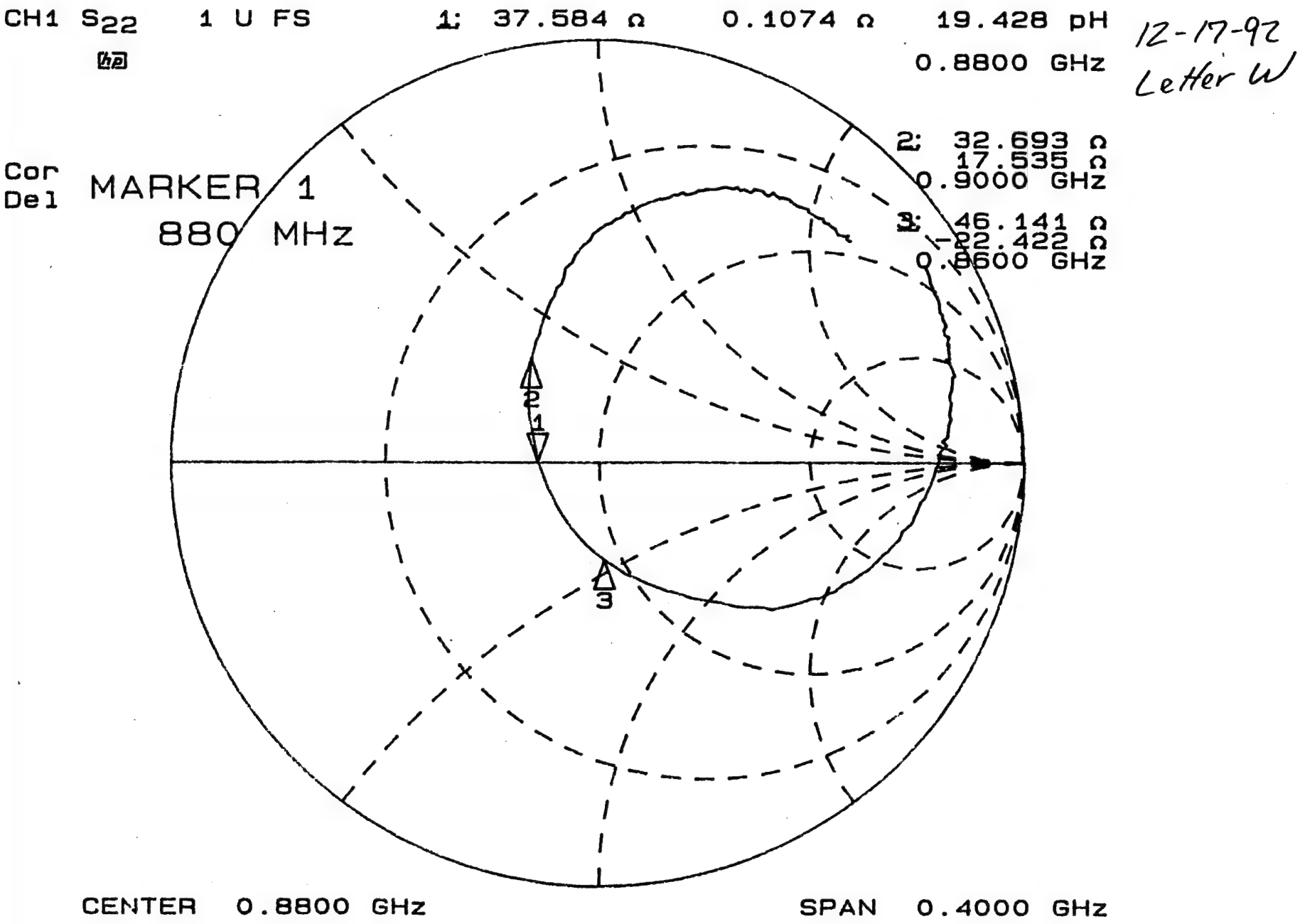
Letter Decal Antennas



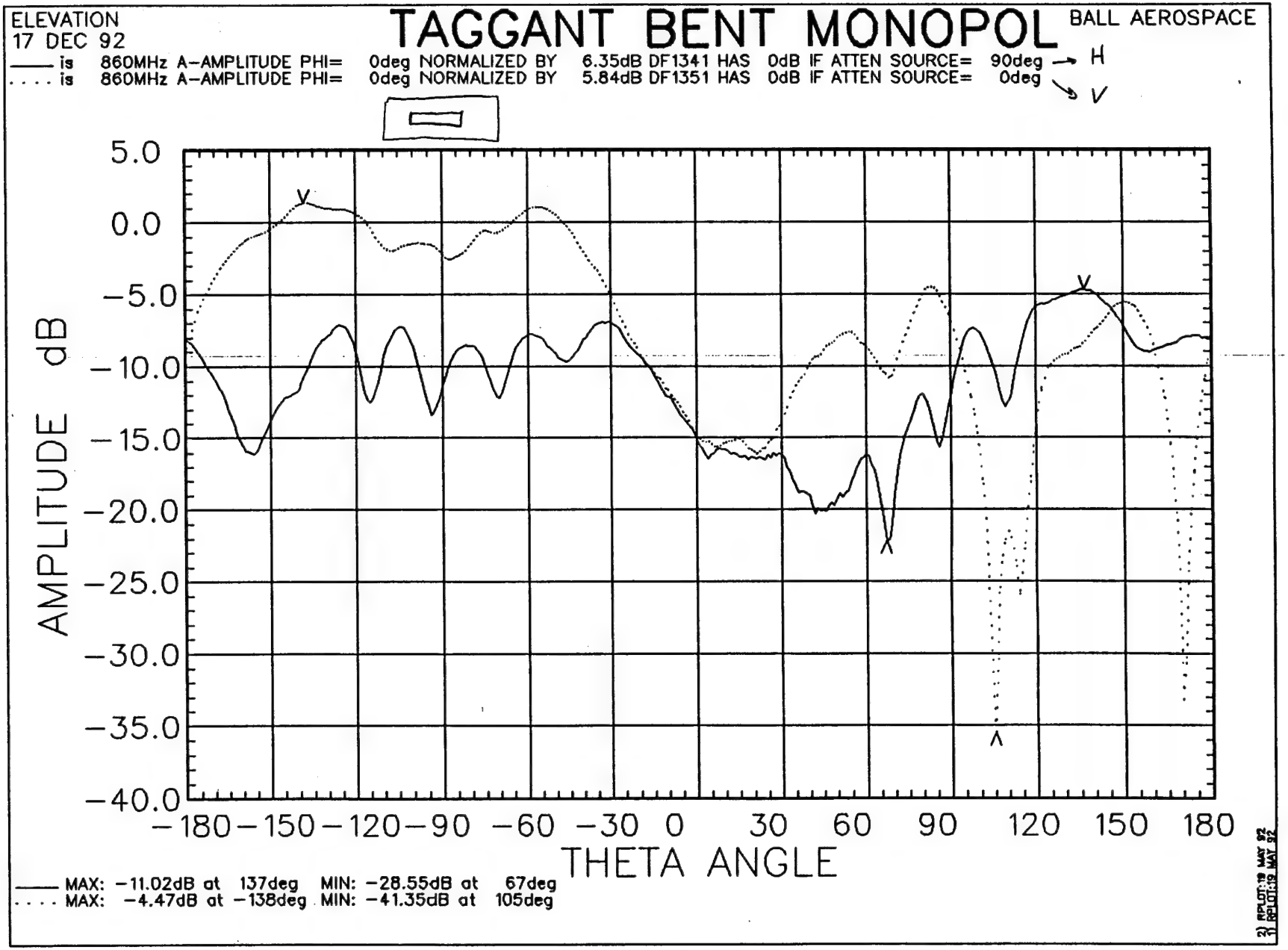
12-17-92
Letter U

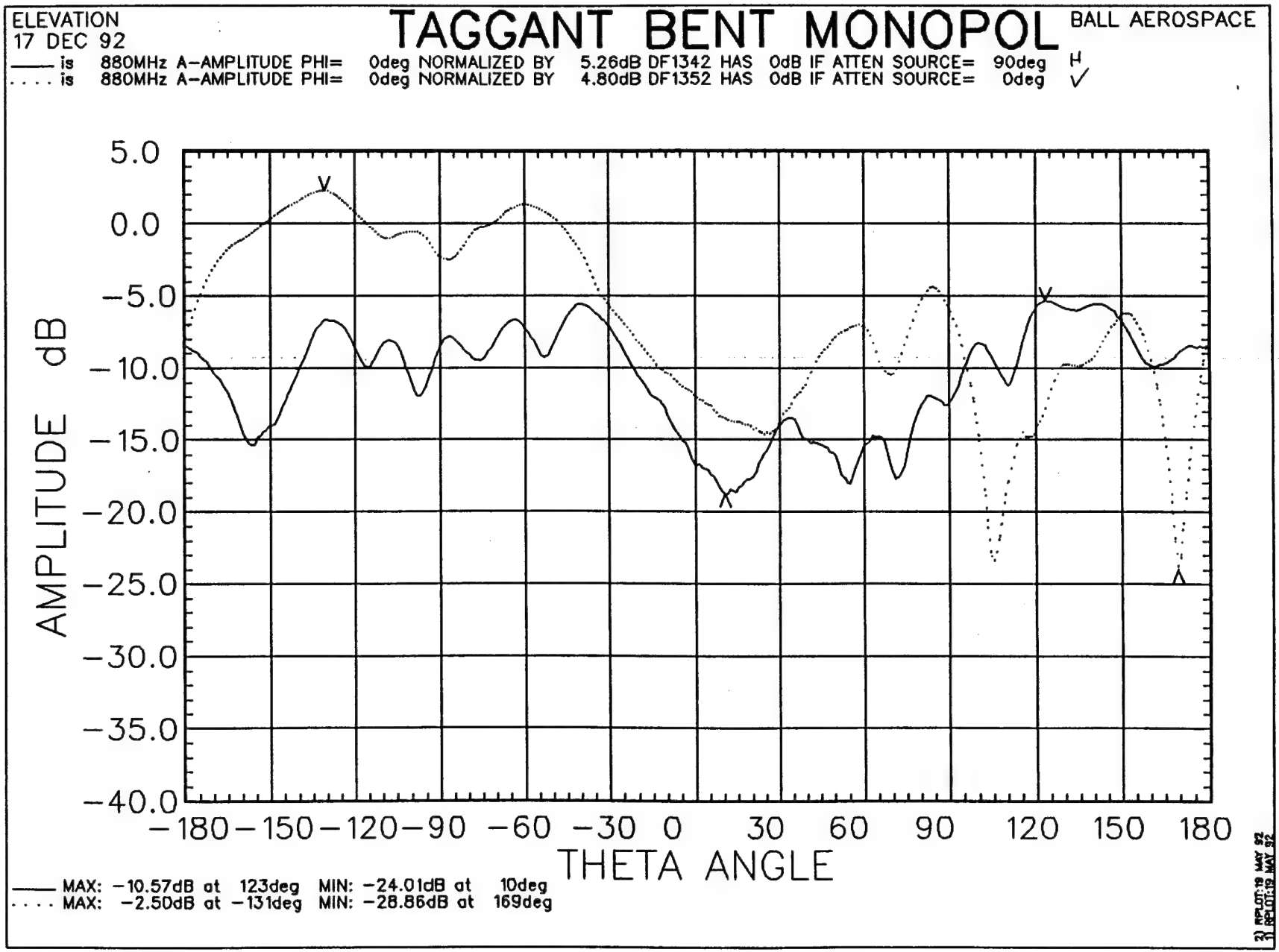


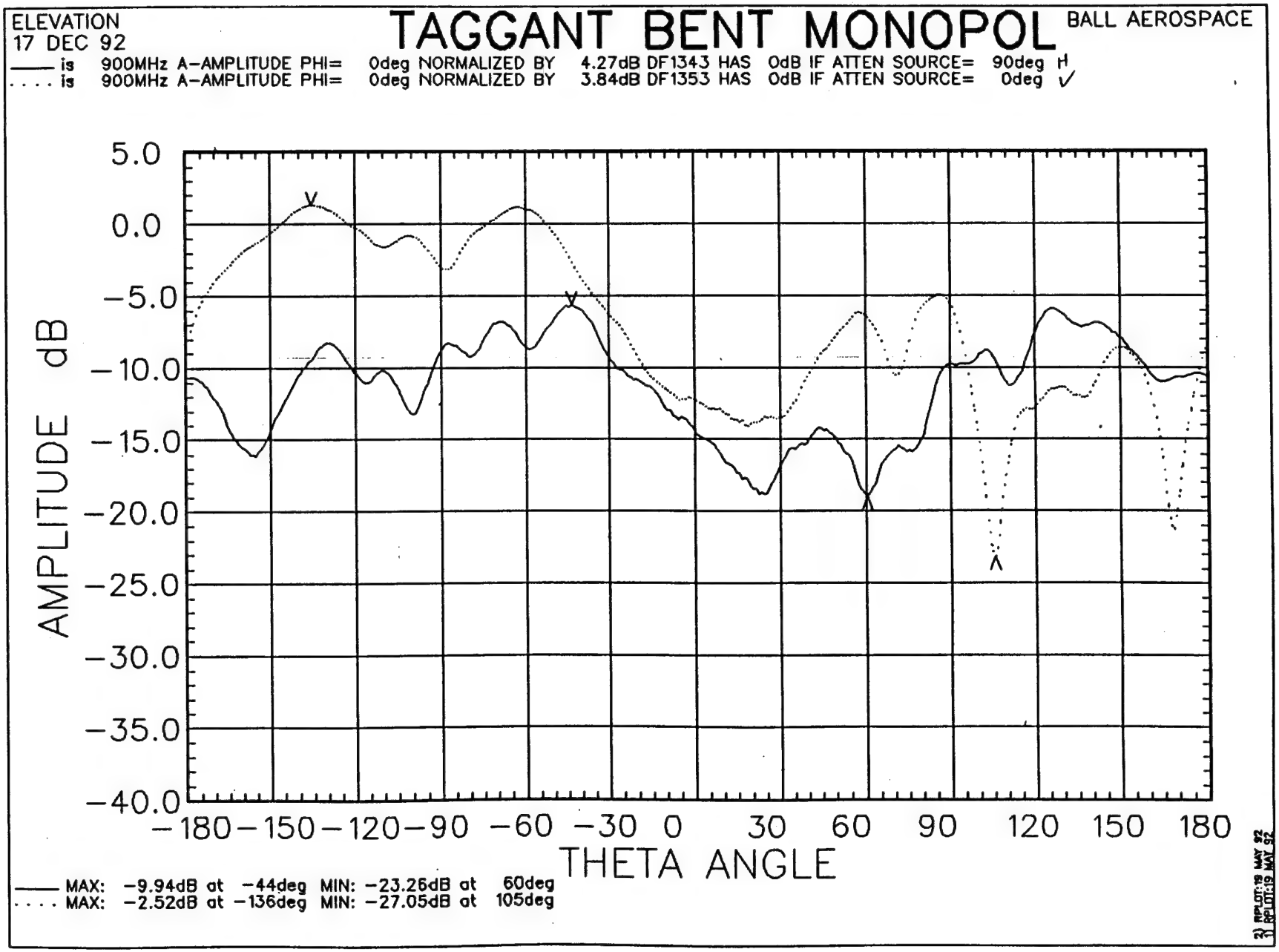
12-17-92
Letter N

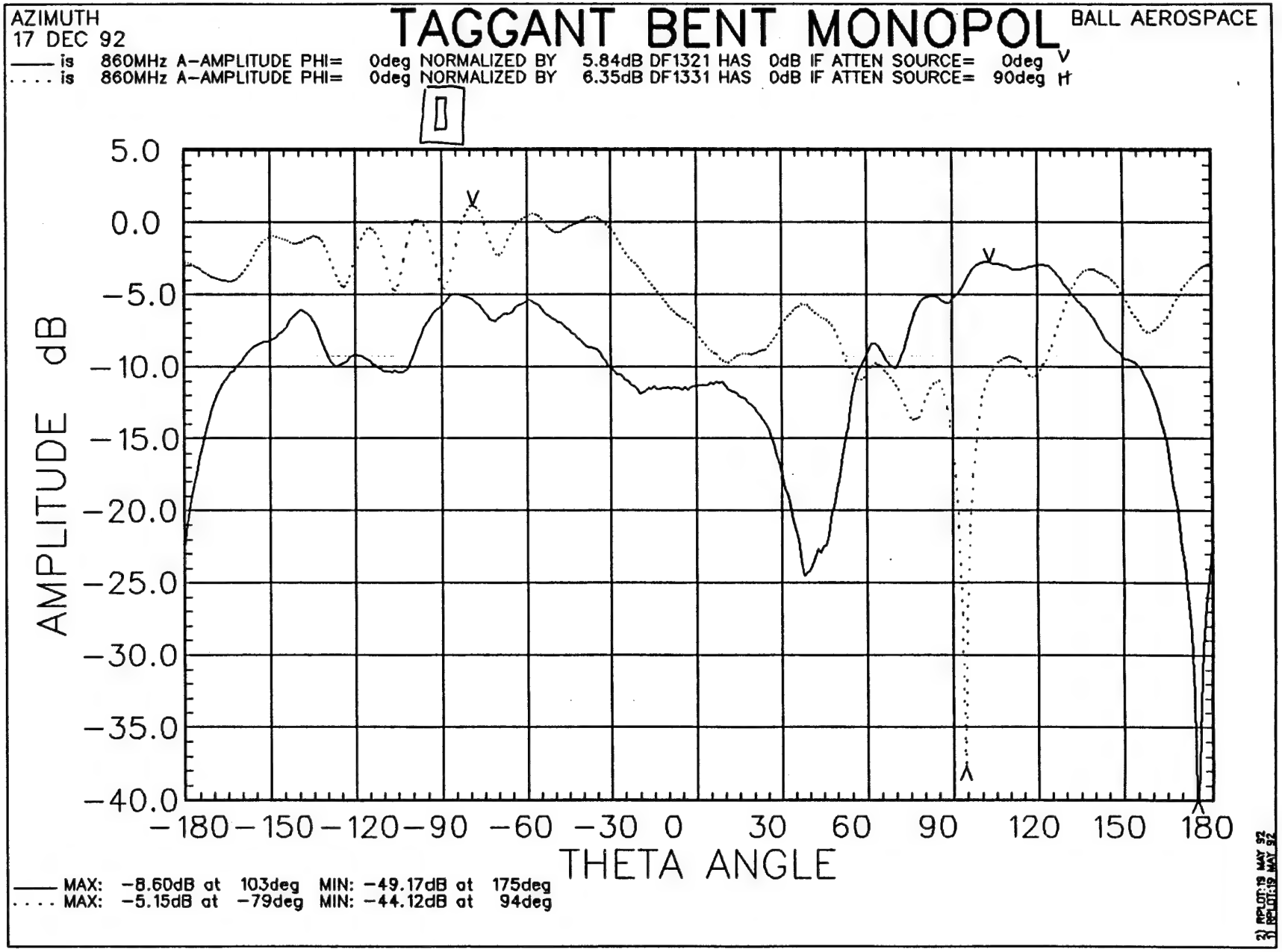


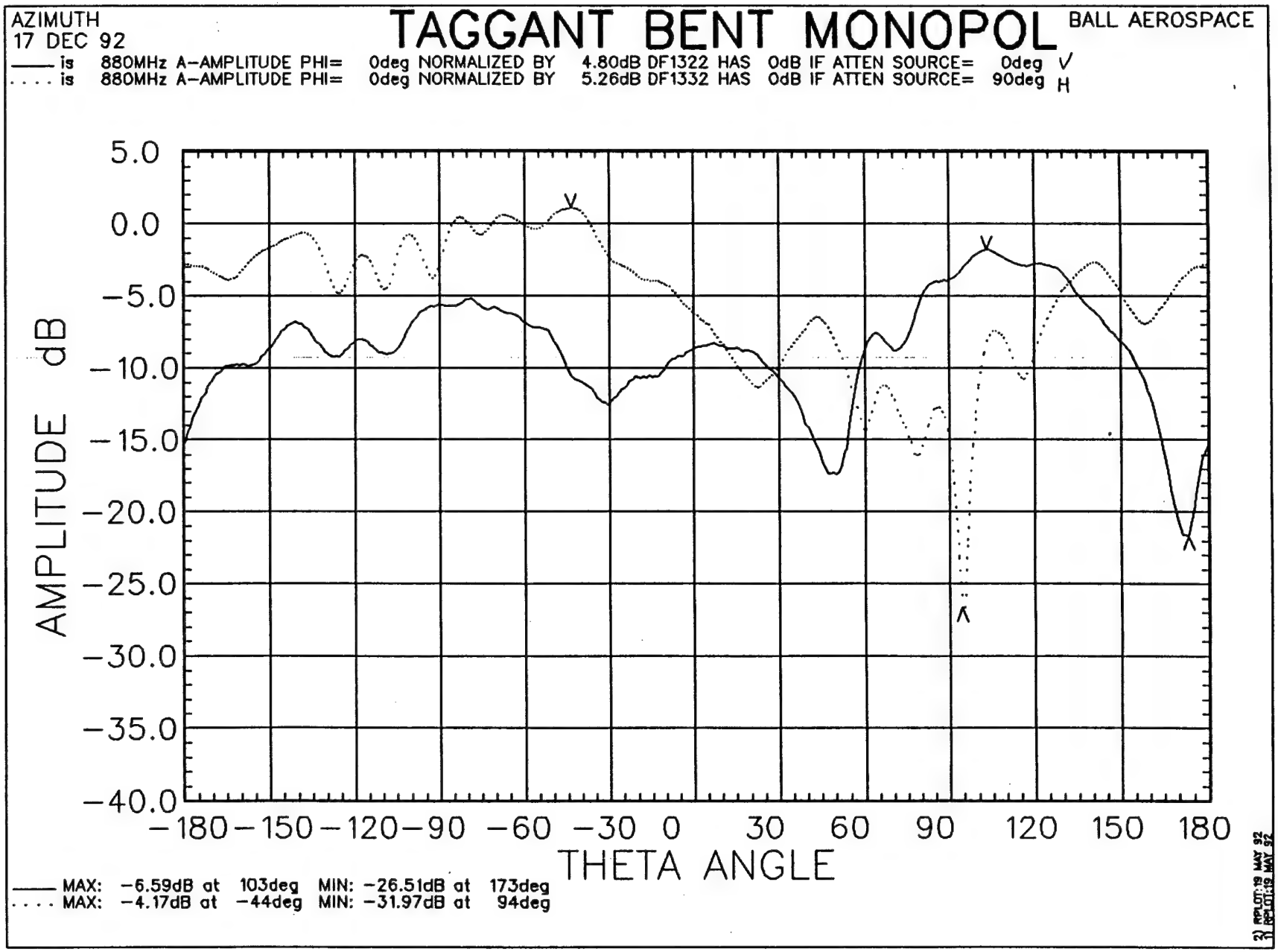
12-17-92
Letter W


ELEVATION
17 DEC 92
TAGGANT BENT MONOPOL
BALL AEROSPACE
—— is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 6.35dB DF1341 HAS 0dB IF ATTEN SOURCE= 90deg → H
. . . . is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.84dB DF1351 HAS 0dB IF ATTEN SOURCE= 0deg → V
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -11.02dB at 137deg MIN: -28.55dB at 67deg
. . . . MAX: -4.47dB at -138deg MIN: -41.35dB at 105deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92


ELEVATION
17 DEC 92
TAGGANT BENT MONOPOL
BALL AEROSPACE
—— is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.26dB DF1342 HAS 0dB IF ATTEN SOURCE= 90deg H
. . . . is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.80dB DF1352 HAS 0dB IF ATTEN SOURCE= 0deg V
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -10.57dB at 123deg MIN: -24.01dB at 10deg
. . . . MAX: -2.50dB at -131deg MIN: -28.86dB at 169deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92


ELEVATION
17 DEC 92
TAGGANT BENT MONOPOL
BALL AEROSPACE
—— is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.27dB DF1343 HAS 0dB IF ATTEN SOURCE= 90deg H
. . . . is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 3.84dB DF1353 HAS 0dB IF ATTEN SOURCE= 0deg V
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -9.94dB at -44deg MIN: -23.26dB at 60deg
. . . . MAX: -2.52dB at -136deg MIN: -27.05dB at 105deg
2) RPLOT:19 MAY 92
3) RPLOT:19 MAY 92


AZIMUTH
17 DEC 92
TAGGANT BENT MONOPOL
BALL AEROSPACE
—— is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.84dB DF1321 HAS 0dB IF ATTEN SOURCE= 0deg V
. . . . is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 6.35dB DF1331 HAS 0dB IF ATTEN SOURCE= 90deg H
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -8.60dB at 103deg MIN: -49.17dB at 175deg
. . . . MAX: -5.15dB at -79deg MIN: -44.12dB at 94deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

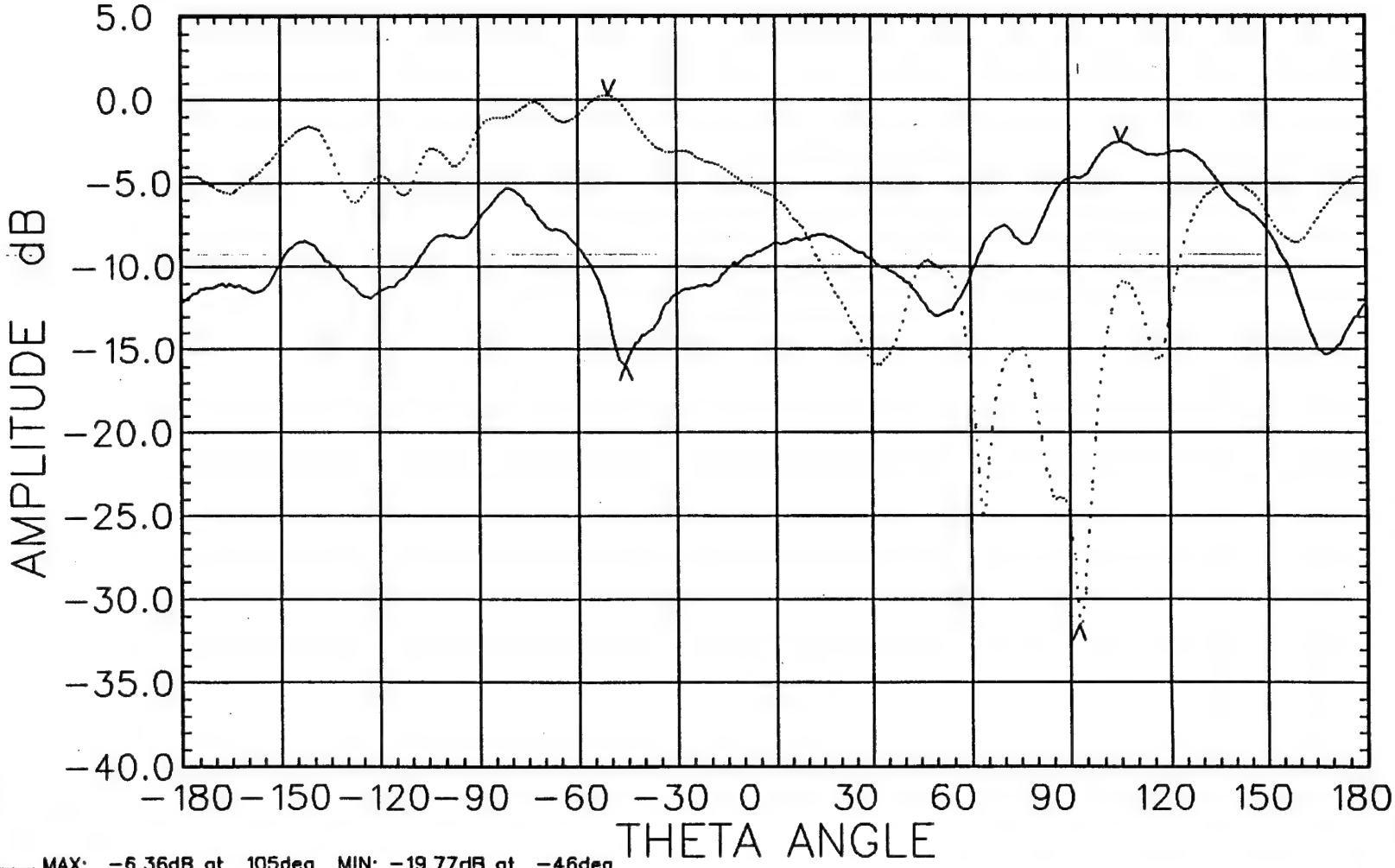

AZIMUTH
17 DEC 92
TAGGANT BENT MONOPOL
BALL AEROSPACE
—— is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.80dB DF1322 HAS 0dB IF ATTEN SOURCE= 0deg V
. . . . is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.26dB DF1332 HAS 0dB IF ATTEN SOURCE= 90deg H
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -6.59dB at 103deg MIN: -26.51dB at 173deg
. . . . MAX: -4.17dB at -44deg MIN: -31.97dB at 94deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

AZIMUTH
17 DEC 92

TAGGANT BENT MONOPOL

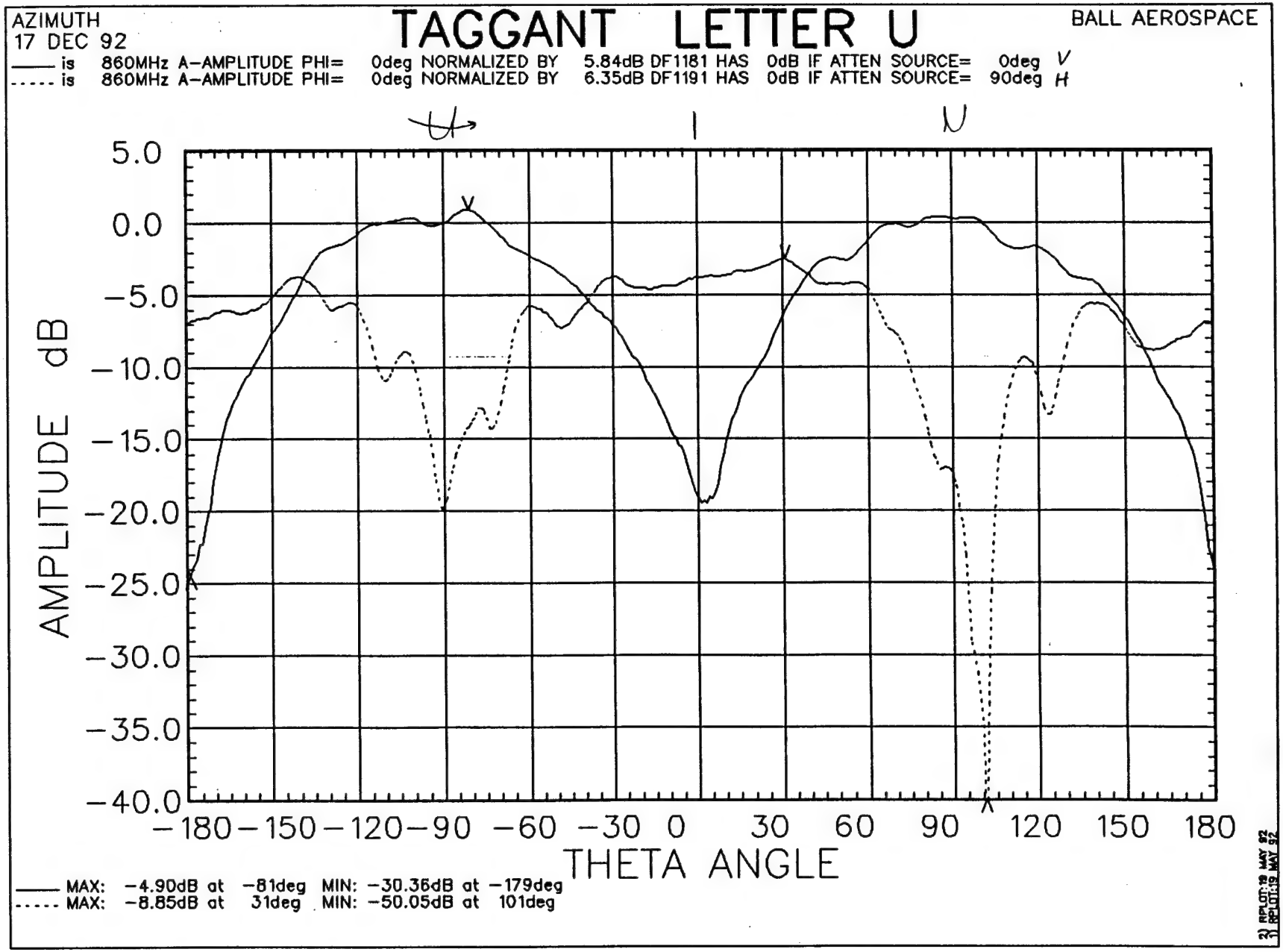
BALL AEROSPACE

—— is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 3.84dB DF1323 HAS 0dB IF ATTEN SOURCE= 0deg V
. . . . is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.27dB DF1333 HAS 0dB IF ATTEN SOURCE= 90deg H



—— MAX: -6.36dB at 105deg MIN: -19.77dB at -46deg
. . . . MAX: -3.97dB at -51deg MIN: -35.86dB at 92deg

2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

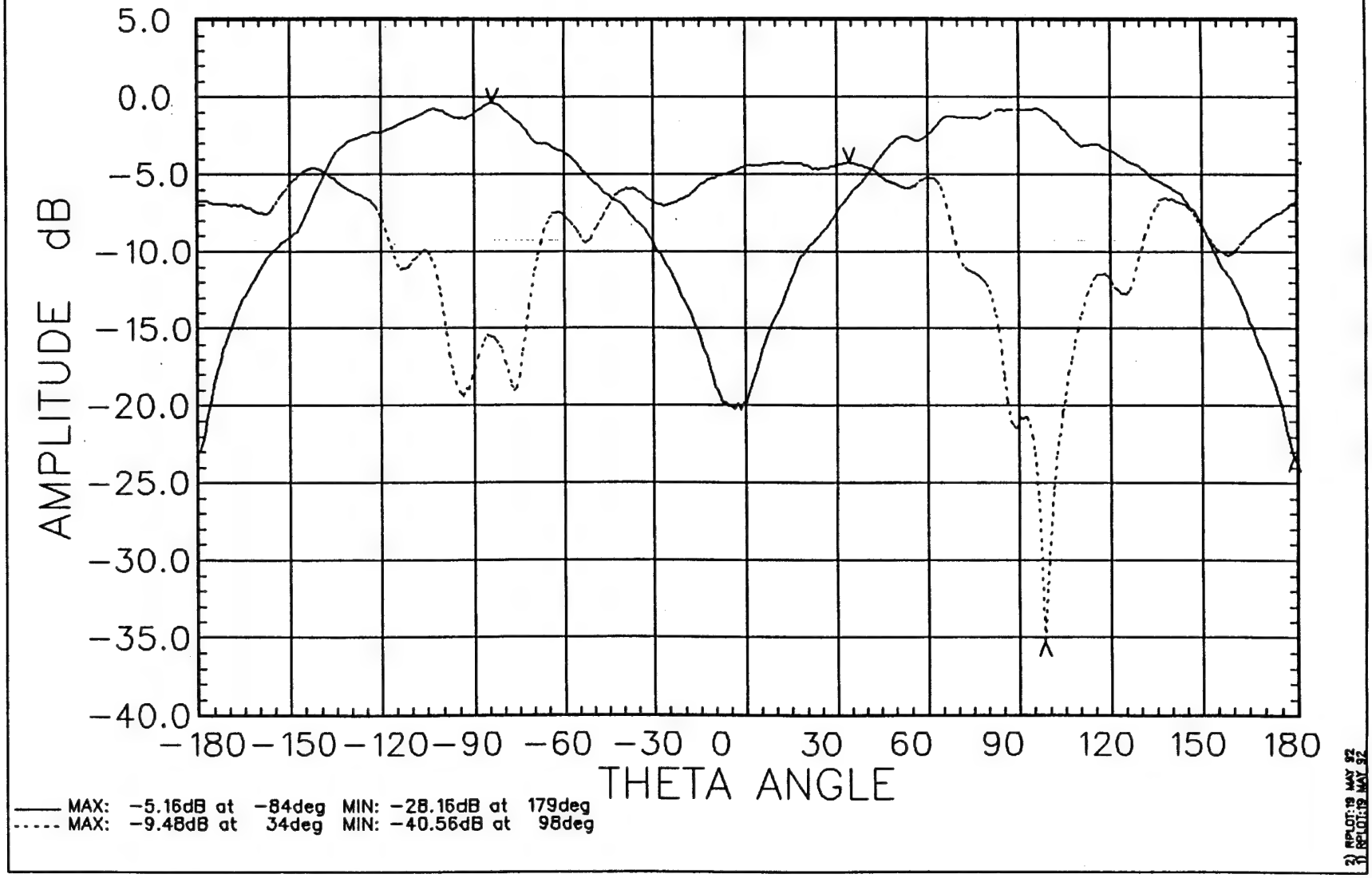

AZIMUTH
17 DEC 92
TAGGANT LETTER U
BALL AEROSPACE
—— is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.84dB DF1181 HAS 0dB IF ATTEN SOURCE= 0deg V
----- is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 6.35dB DF1191 HAS 0dB IF ATTEN SOURCE= 90deg H
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -4.90dB at -81deg MIN: -30.36dB at -179deg
----- MAX: -8.85dB at 31deg MIN: -50.05dB at 101deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

AZIMUTH
17 DEC 92

TAGGANT LETTER U

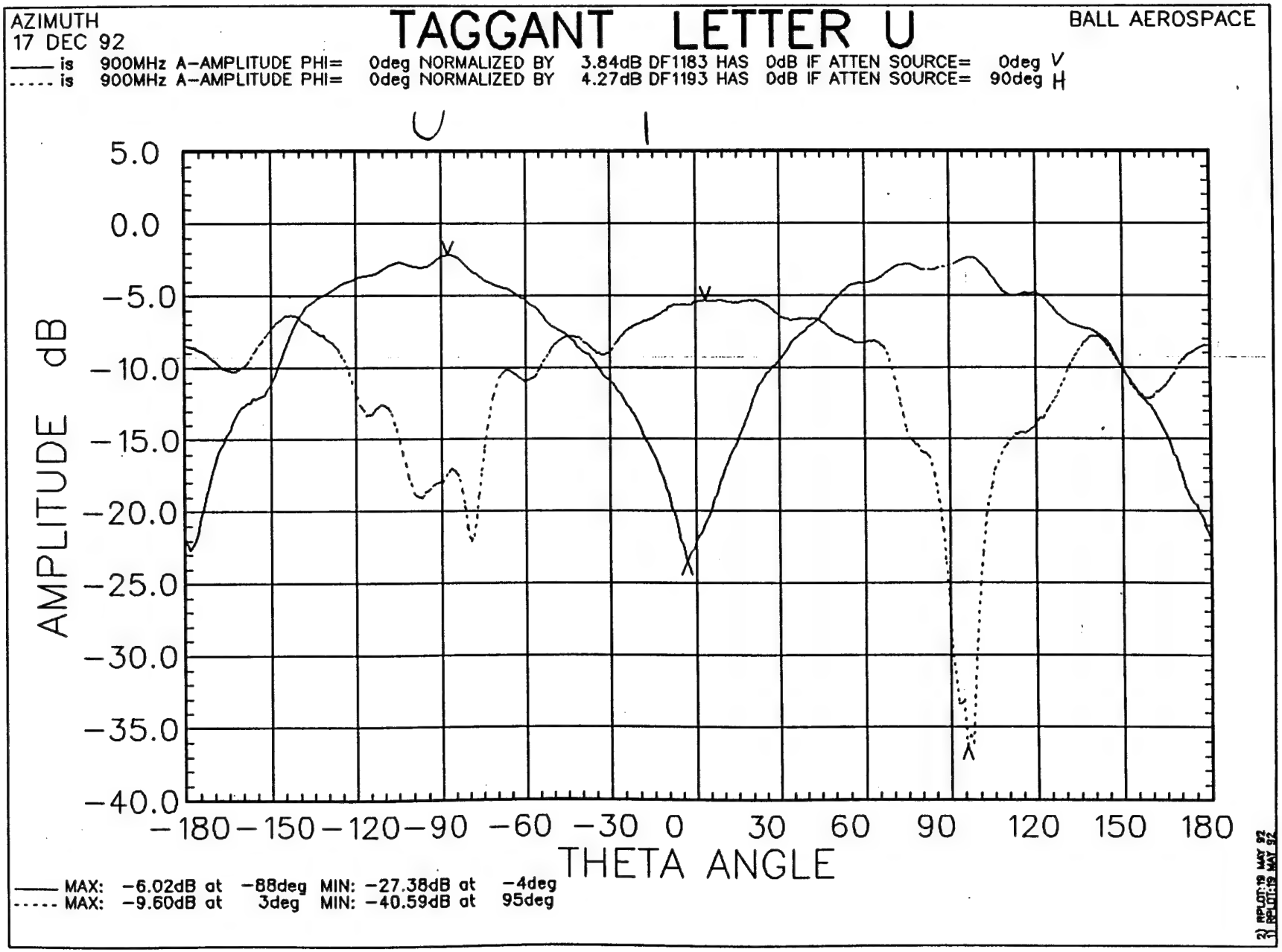
BALL AEROSPACE

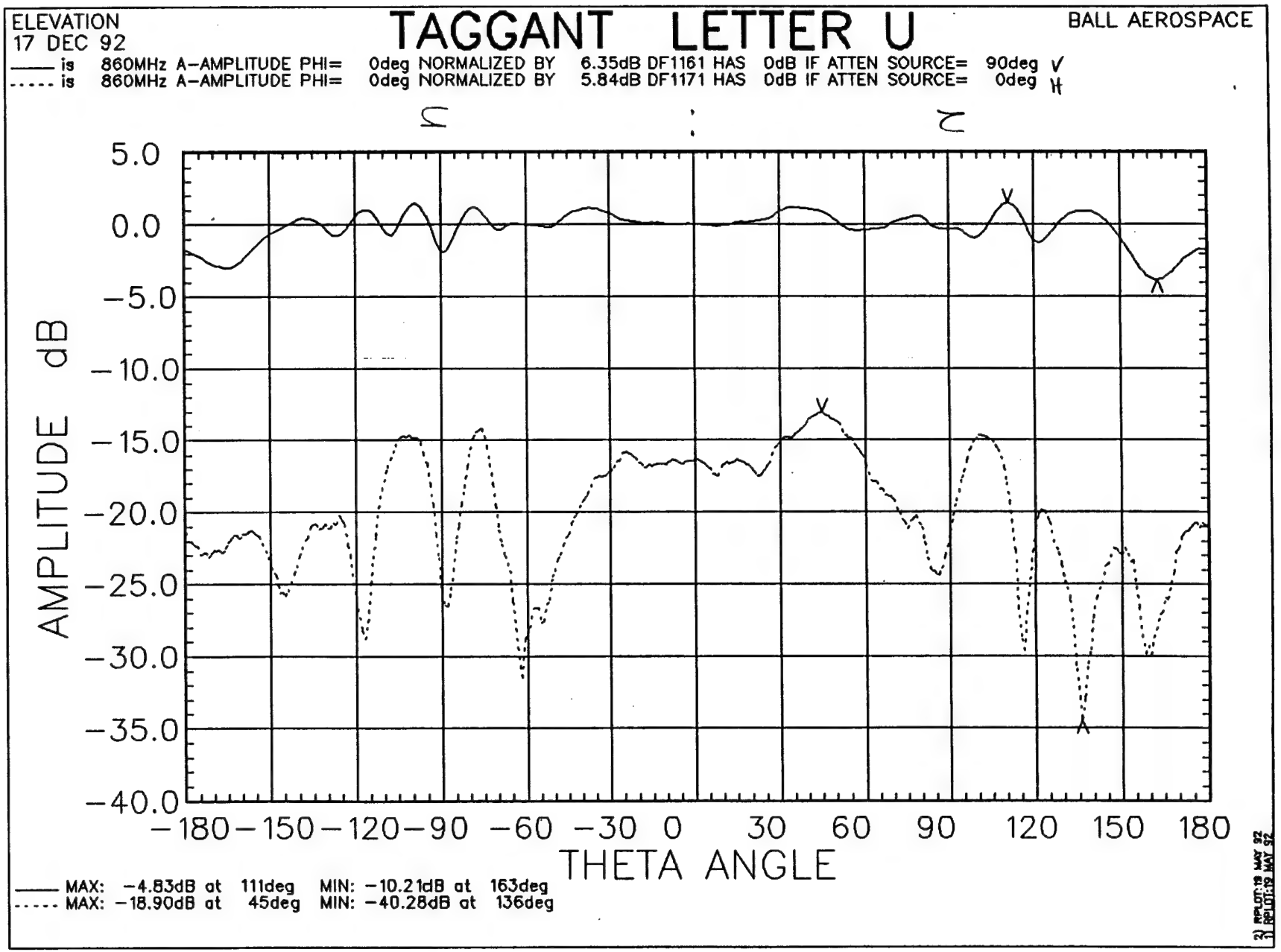
—— is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.80dB DF1182 HAS 0dB IF ATTEN SOURCE= 0deg V
----- is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.26dB DF1192 HAS 0dB IF ATTEN SOURCE= 90deg H



—— MAX: -5.16dB at -84deg MIN: -28.16dB at 179deg
----- MAX: -9.48dB at 34deg MIN: -40.56dB at 98deg

2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92


AZIMUTH
17 DEC 92
TAGGANT LETTER U
BALL AEROSPACE
—— is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 3.84dB DF1183 HAS 0dB IF ATTEN SOURCE= 0deg V
----- is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.27dB DF1193 HAS 0dB IF ATTEN SOURCE= 90deg H
U
I
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
AMPLITUDE dB
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -6.02dB at -88deg MIN: -27.38dB at -4deg
----- MAX: -9.60dB at 3deg MIN: -40.59dB at 95deg
2) RPLOT:19 MAY 92
3) RPLOT:19 MAY 92

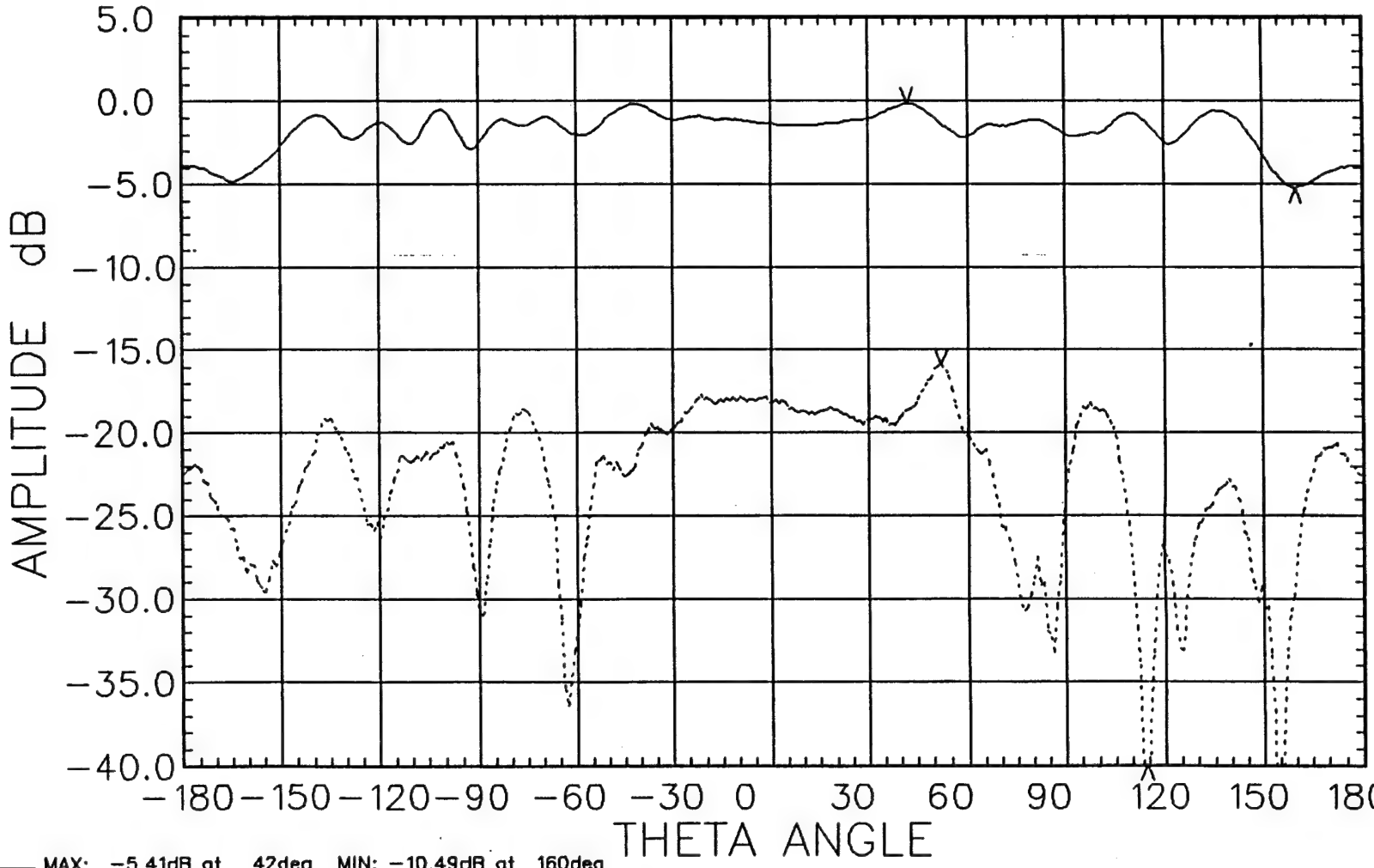

ELEVATION
17 DEC 92
TAGGANT LETTER U
BALL AEROSPACE
—— is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 6.35dB DF1161 HAS 0dB IF ATTEN SOURCE= 90deg V
----- is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.84dB DF1171 HAS 0dB IF ATTEN SOURCE= 0deg H
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -4.83dB at 111deg MIN: -10.21dB at 163deg
----- MAX: -18.90dB at 45deg MIN: -40.28dB at 136deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

ELEVATION
17 DEC 92

TAGGANT LETTER U

BALL AEROSPACE

—— is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.26dB DF1162 HAS 0dB IF ATTEN SOURCE= 90deg V
----- is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.80dB DF1172 HAS 0dB IF ATTEN SOURCE= 0deg H



—— MAX: -5.41dB at 42deg MIN: -10.49dB at 160deg
----- MAX: -20.67dB at 52deg MIN: -54.56dB at 114deg

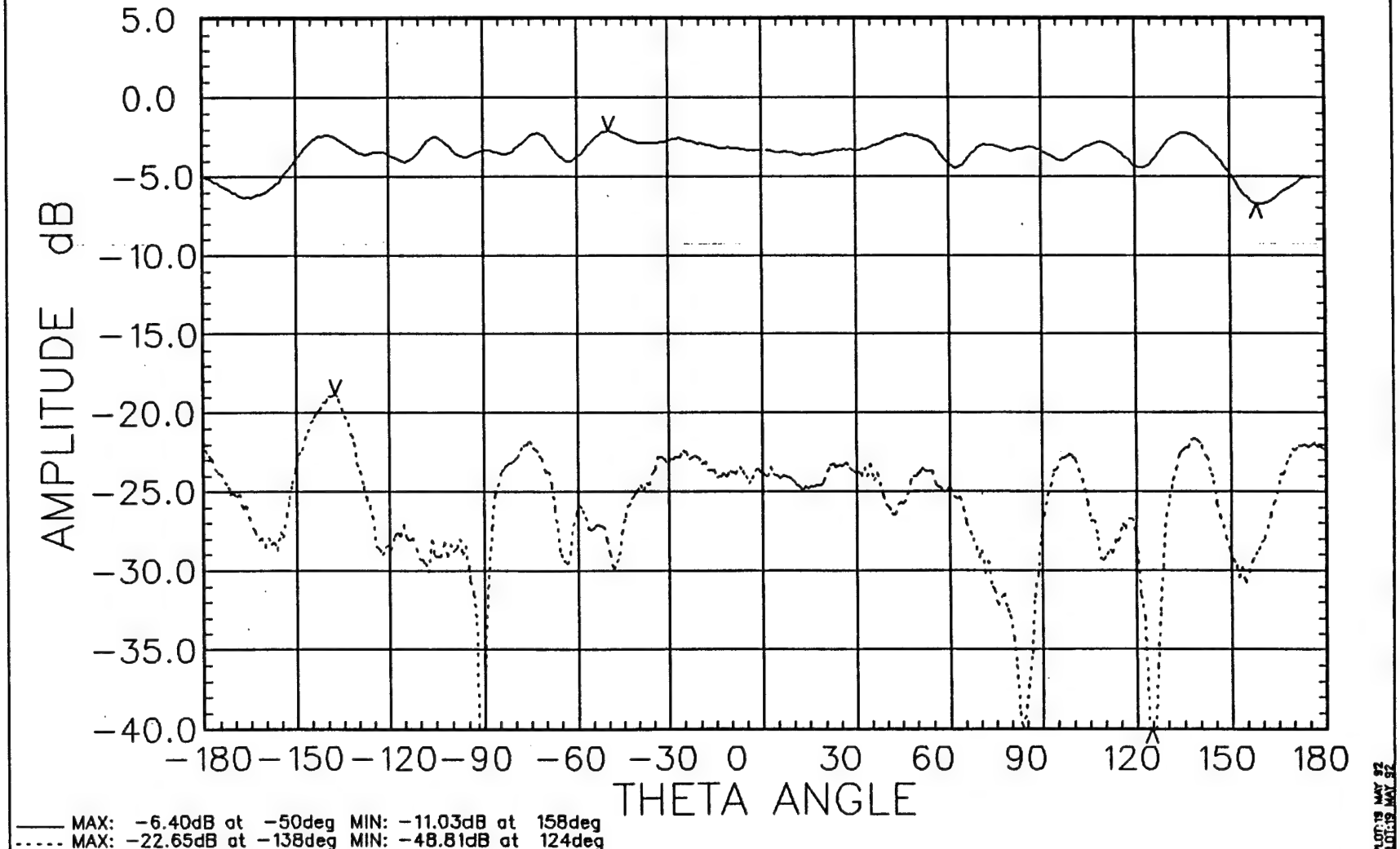
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

ELEVATION
17 DEC 92

TAGGANT LETTER U

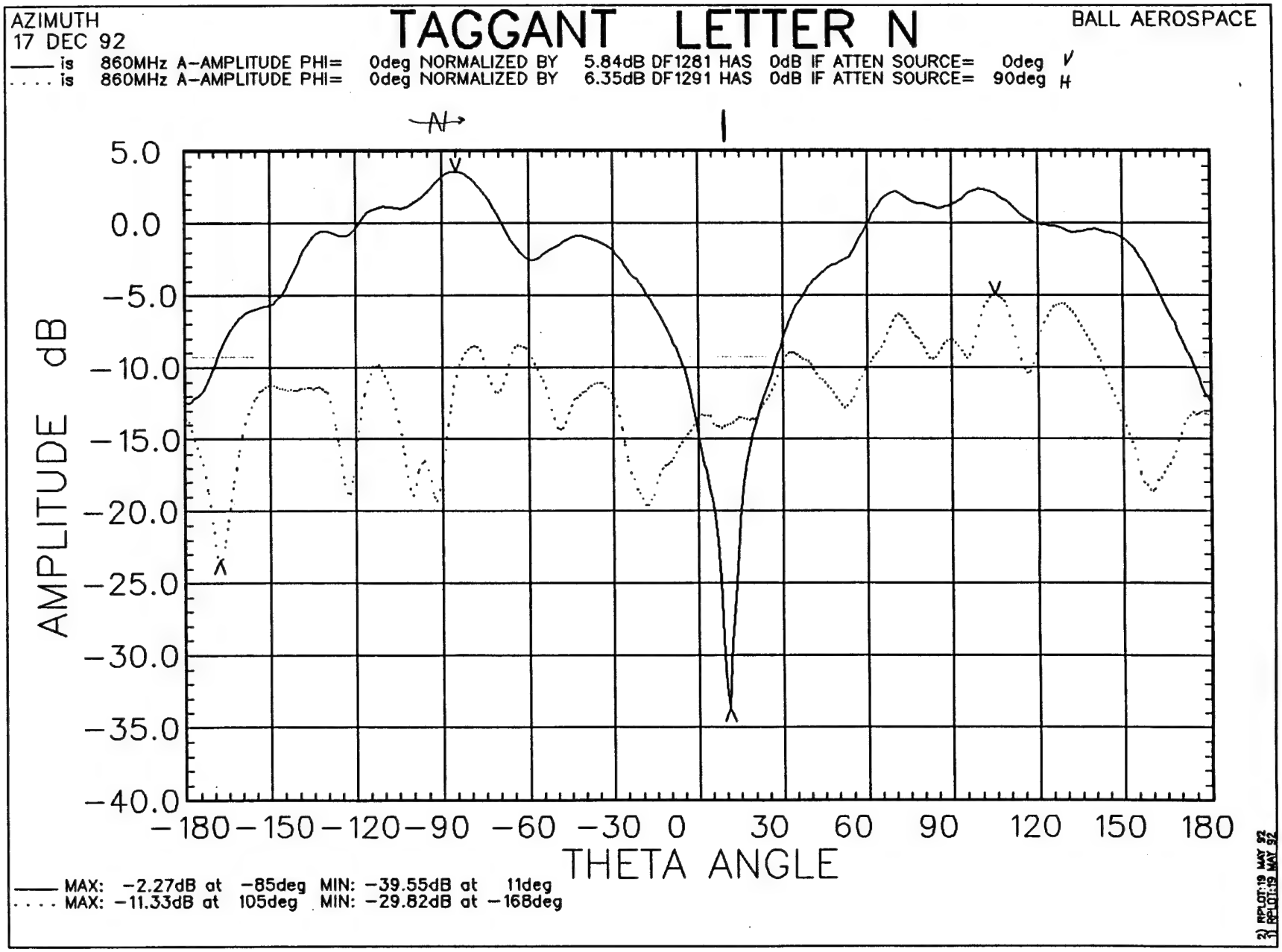
BALL AEROSPACE

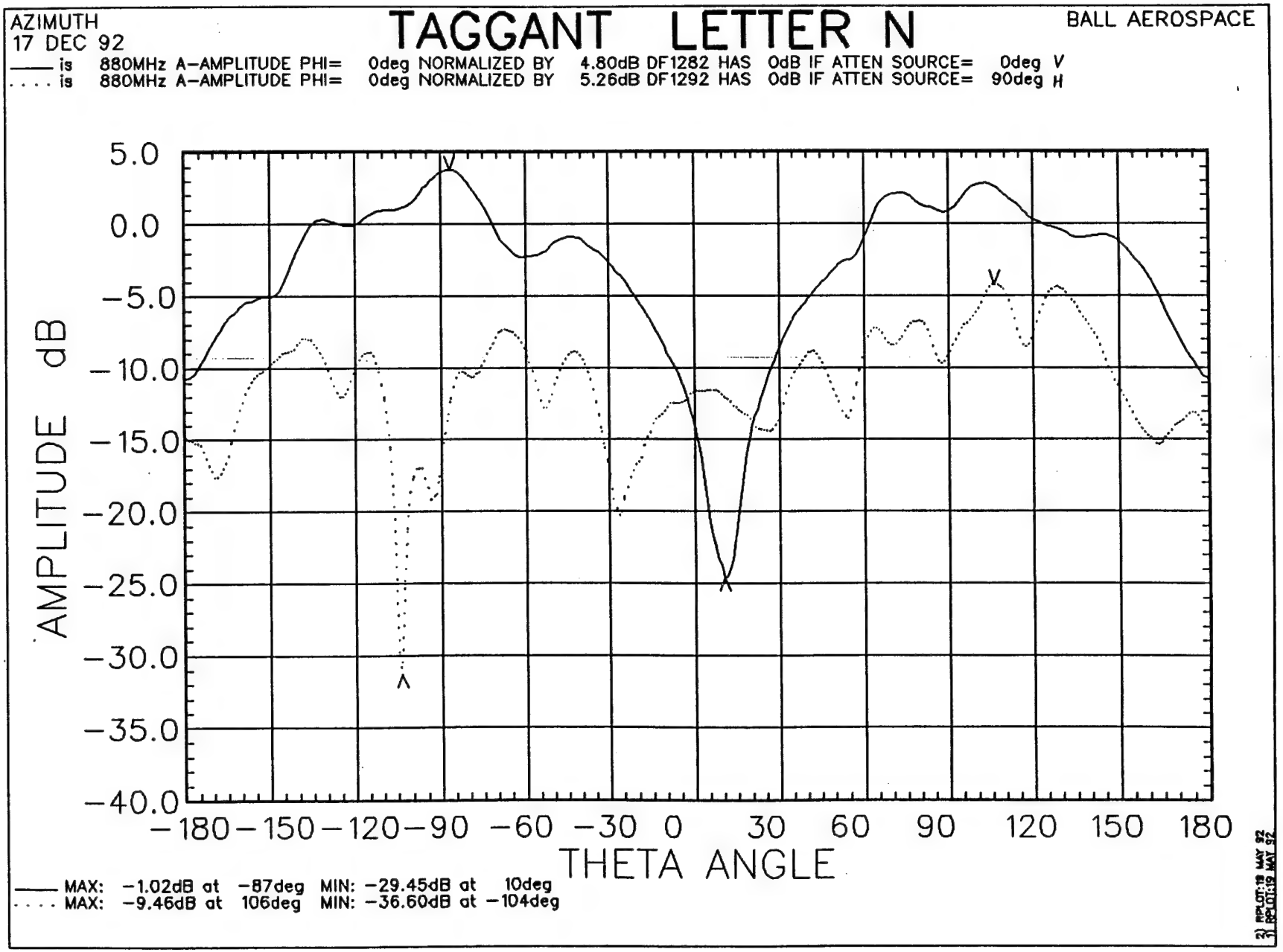
—— is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.27dB DF1163 HAS 0dB IF ATTEN SOURCE= 90deg V
----- is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 3.84dB DF1173 HAS 0dB IF ATTEN SOURCE= 0deg H



—— MAX: -6.40dB at -50deg MIN: -11.03dB at 158deg
----- MAX: -22.65dB at -138deg MIN: -48.81dB at 124deg

2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92


AZIMUTH
17 DEC 92
TAGGANT LETTER N
BALL AEROSPACE
—— is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.84dB DF1281 HAS 0dB IF ATTEN SOURCE= 0deg V
. . . . is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 6.35dB DF1291 HAS 0dB IF ATTEN SOURCE= 90deg H
N
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
AMPLITUDE dB
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -2.27dB at -85deg MIN: -39.55dB at 11deg
. . . . MAX: -11.33dB at 105deg MIN: -29.82dB at -168deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

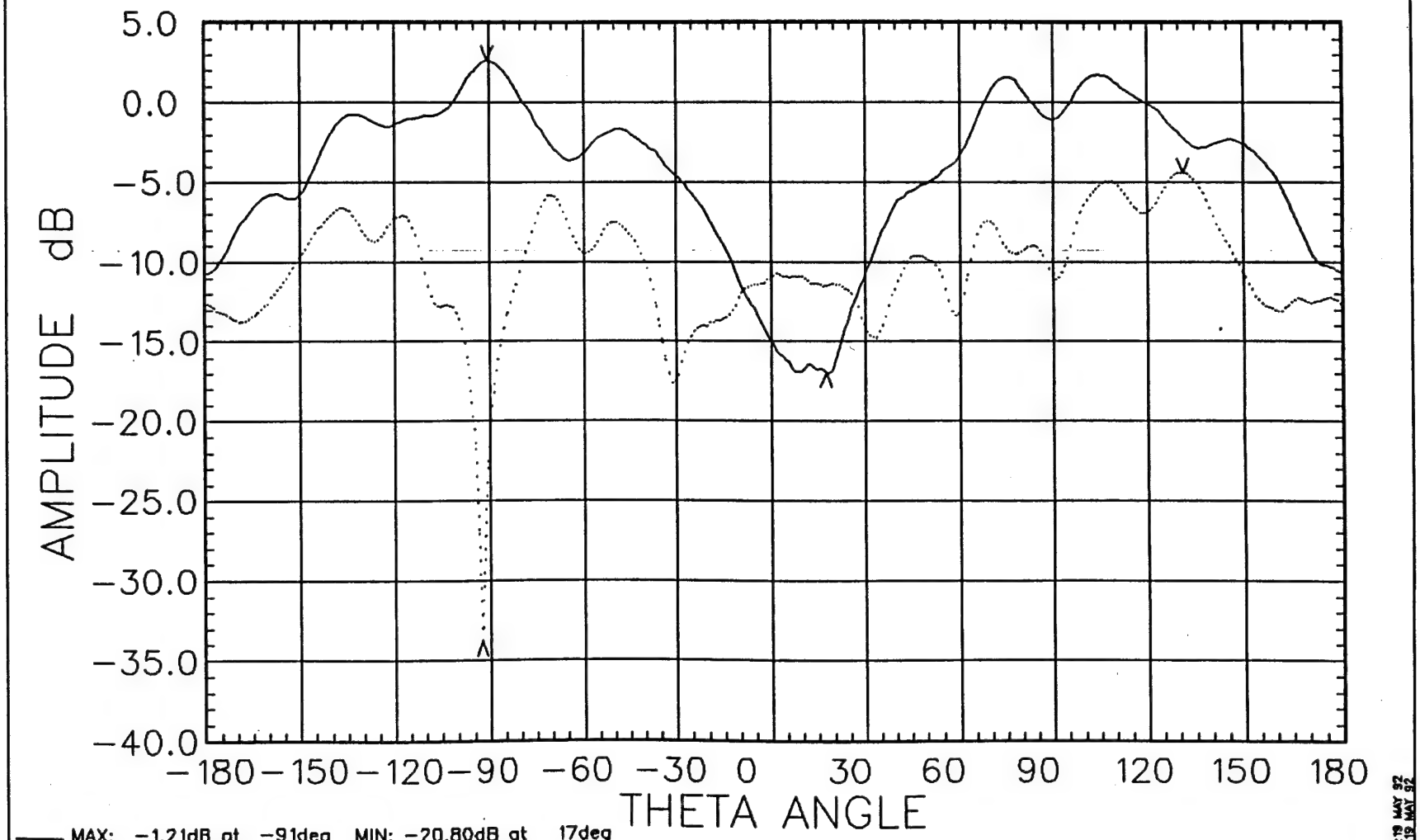

AZIMUTH
17 DEC 92
TAGGANT LETTER N
BALL AEROSPACE
—— is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.80dB DF1282 HAS 0dB IF ATTEN SOURCE= 0deg V
. . . . is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.26dB DF1292 HAS 0dB IF ATTEN SOURCE= 90deg H
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -1.02dB at -87deg MIN: -29.45dB at 10deg
. . . . MAX: -9.46dB at 106deg MIN: -36.60dB at -104deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

AZIMUTH
17 DEC 92

TAGGANT LETTER N

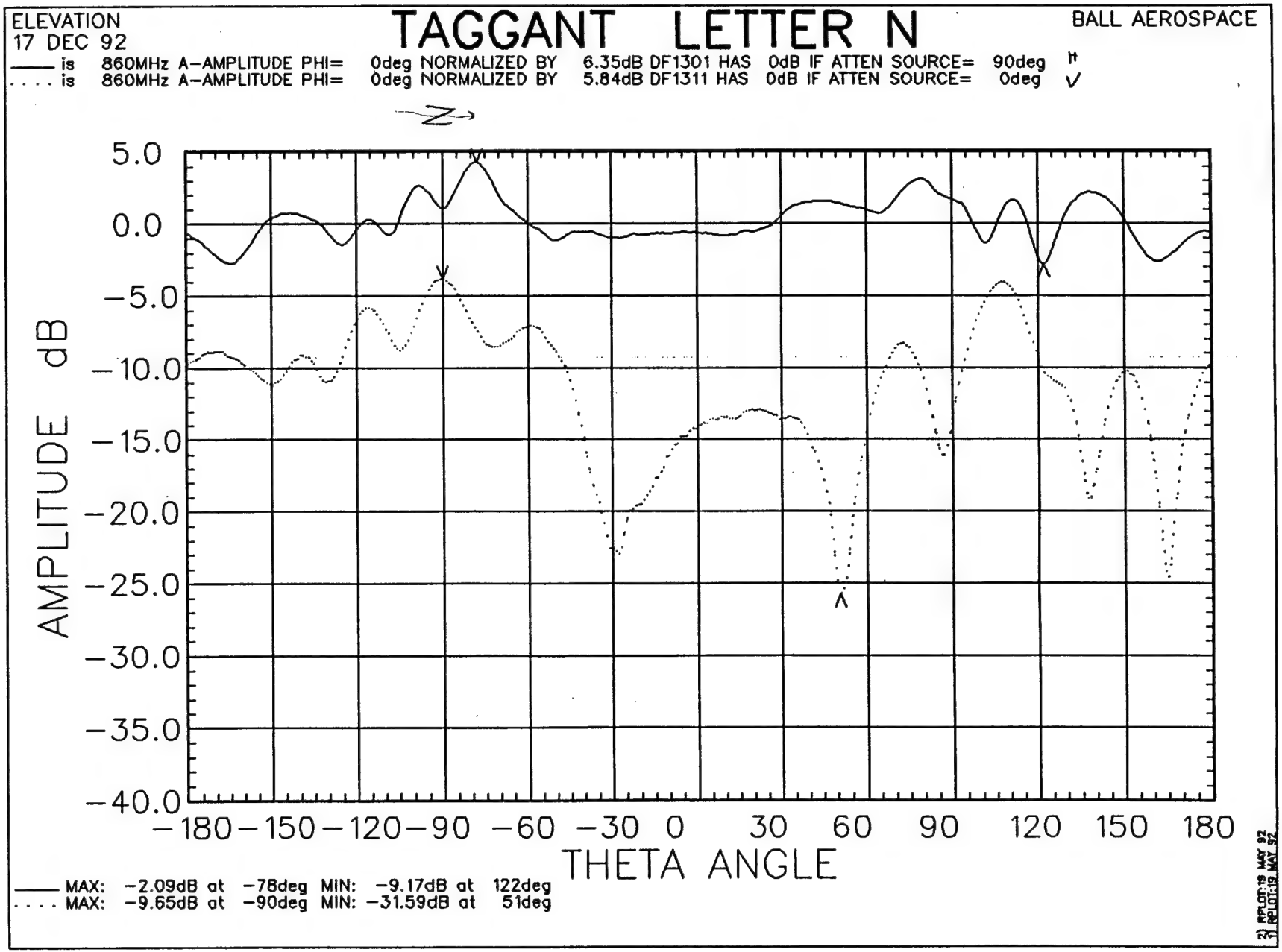
BALL AEROSPACE

—— is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 3.84dB DF1283 HAS 0dB IF ATTEN SOURCE= 0deg V
. . . . is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.27dB DF1293 HAS 0dB IF ATTEN SOURCE= 90deg H



—— MAX: -1.21dB at -91deg MIN: -20.80dB at 17deg
. . . . MAX: -8.67dB at 131deg MIN: -38.09dB at -93deg

2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

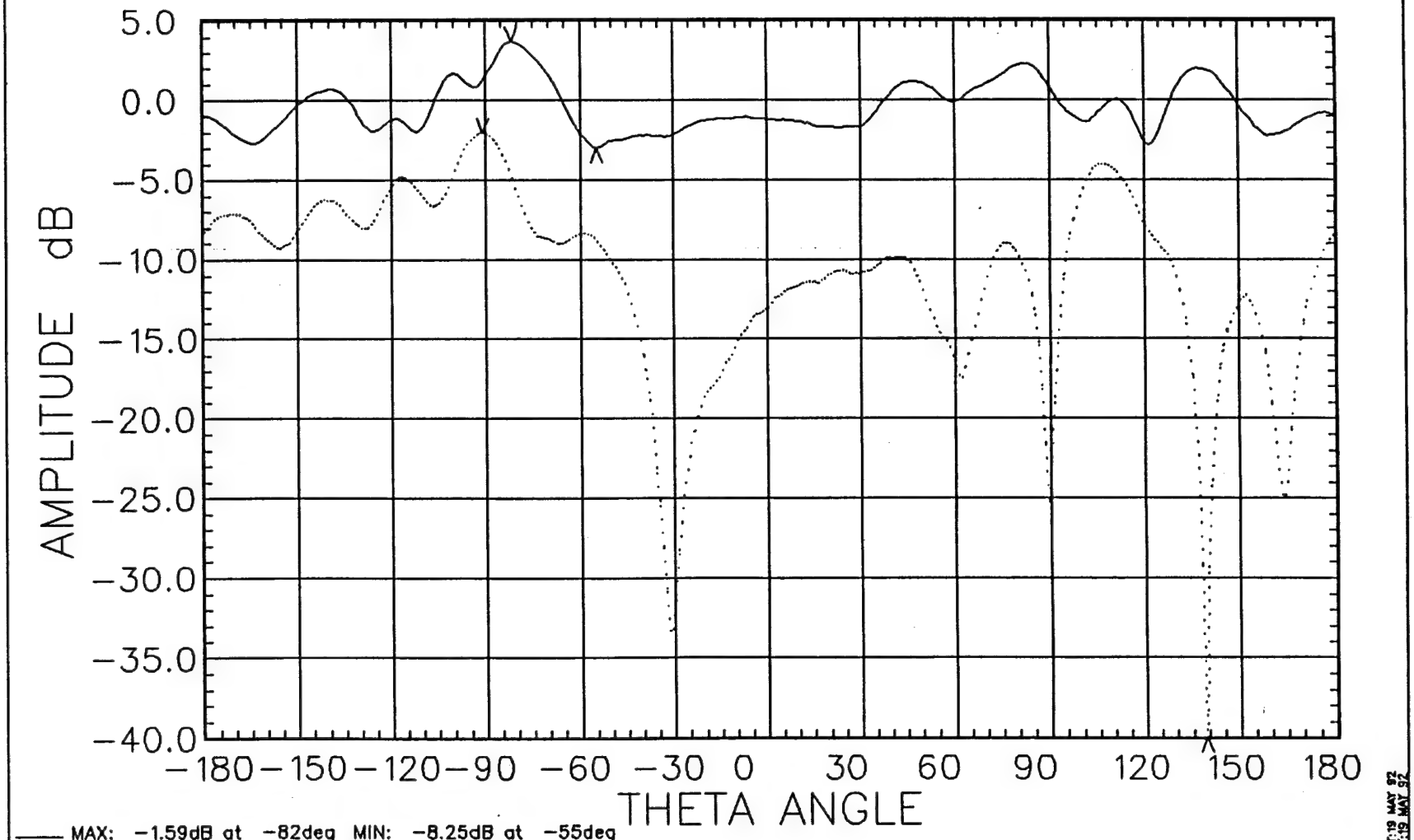

ELEVATION
17 DEC 92
TAGGANT LETTER N
BALL AEROSPACE
—— is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 6.35dB DF1301 HAS 0dB IF ATTEN SOURCE= 90deg H
. . . . is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.84dB DF1311 HAS 0dB IF ATTEN SOURCE= 0deg V
Z
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
AMPLITUDE dB
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -2.09dB at -78deg MIN: -9.17dB at 122deg
. . . . MAX: -9.65dB at -90deg MIN: -31.59dB at 51deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

ELEVATION
17 DEC 92

TAGGANT LETTER N

BALL AEROSPACE

—— is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.26dB DF1302 HAS 0dB IF ATTEN SOURCE= 90deg H
. . . . is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.80dB DF1312 HAS 0dB IF ATTEN SOURCE= 0deg V



—— MAX: -1.59dB at -82deg MIN: -8.25dB at -55deg
. . . . MAX: -6.85dB at -91deg MIN: -46.02dB at 139deg

2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

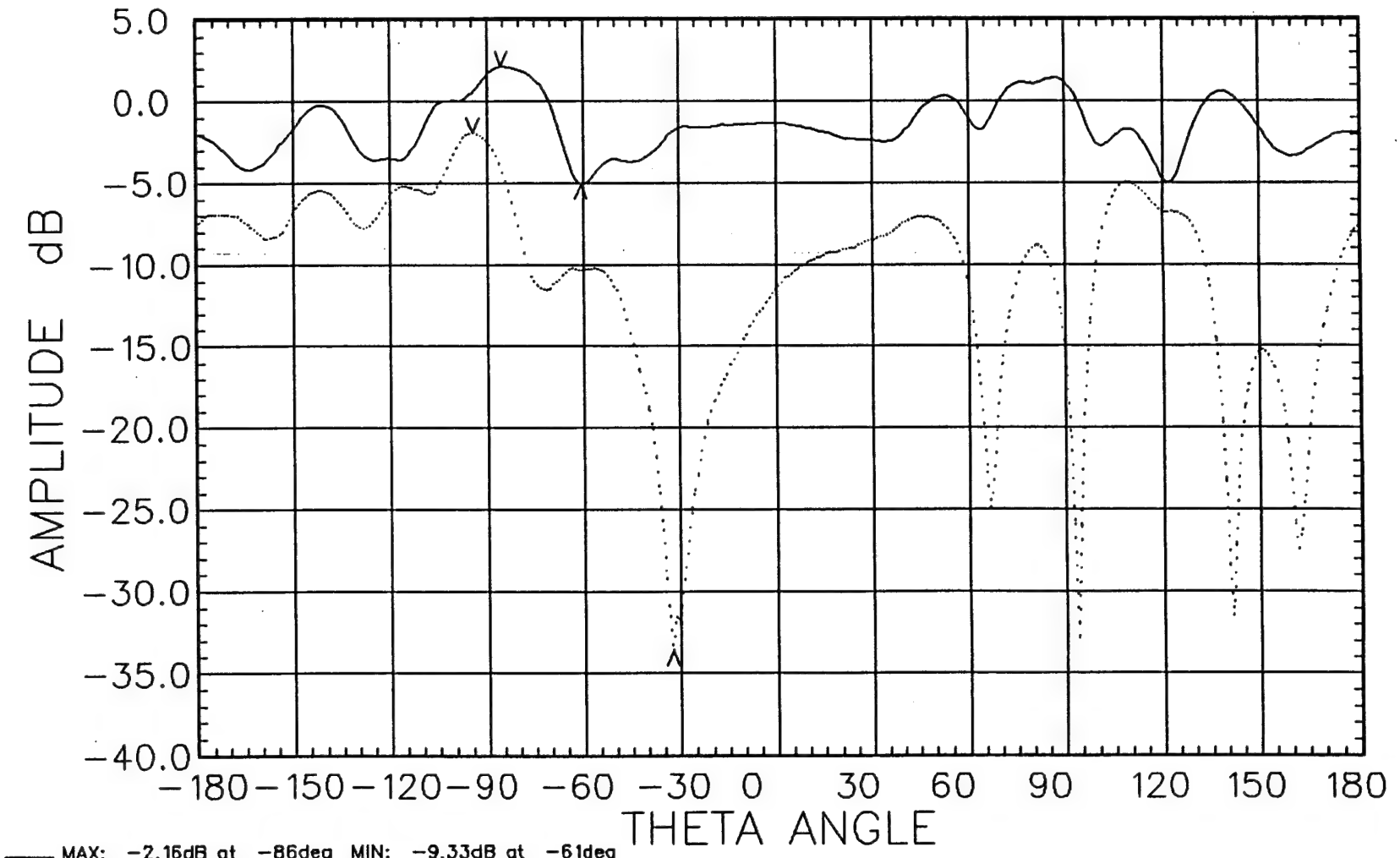
ELEVATION
17 DEC 92

TAGGANT LETTER N

BALL AEROSPACE

—— is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.27dB DF1303 HAS 0dB IF ATTEN SOURCE= 90deg

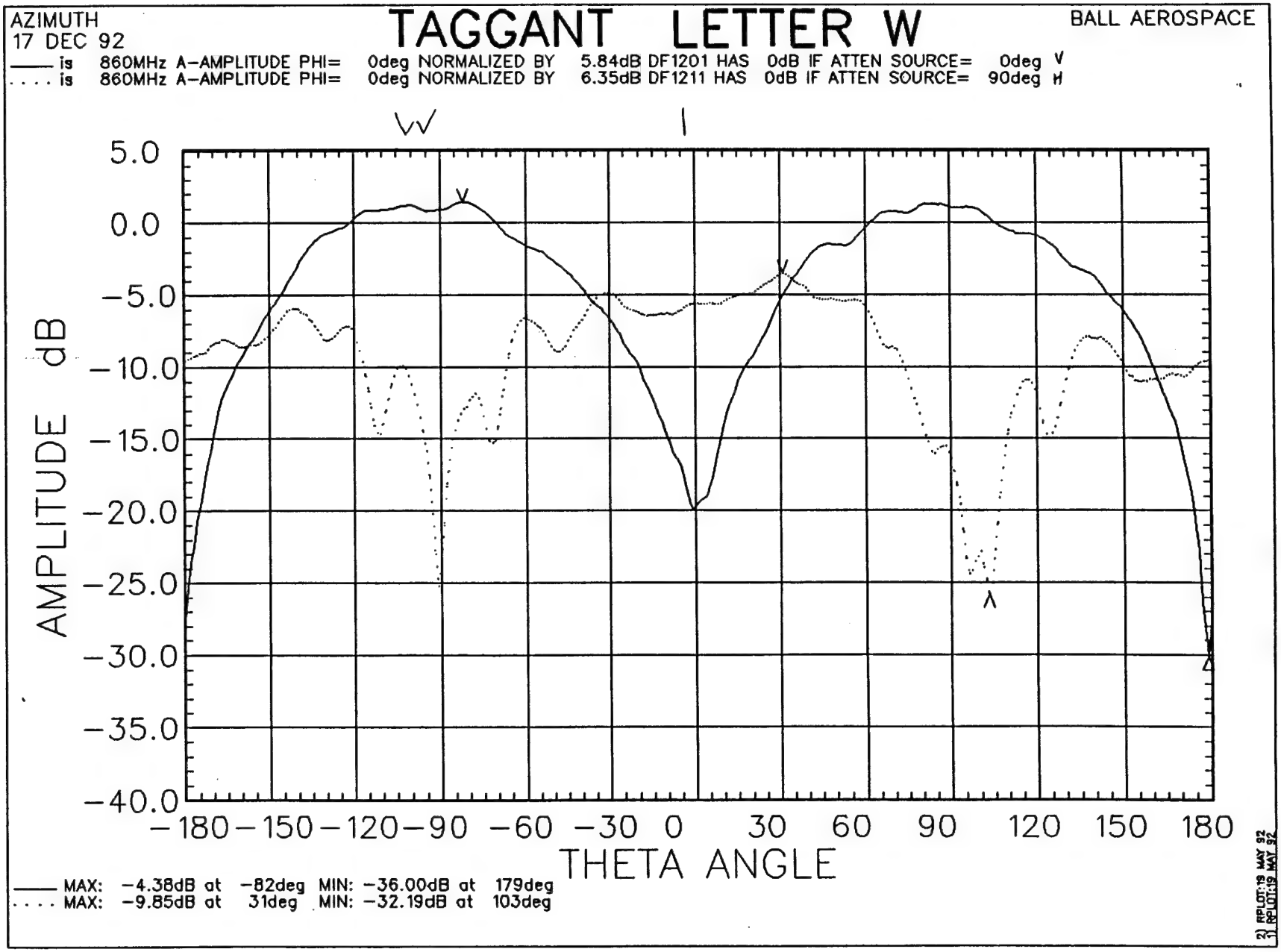
. . . . is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 3.84dB DF1313 HAS 0dB IF ATTEN SOURCE= 0deg



—— MAX: -2.16dB at -86deg MIN: -9.33dB at -61deg

. . . . MAX: -5.78dB at -95deg MIN: -37.46dB at -33deg

2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

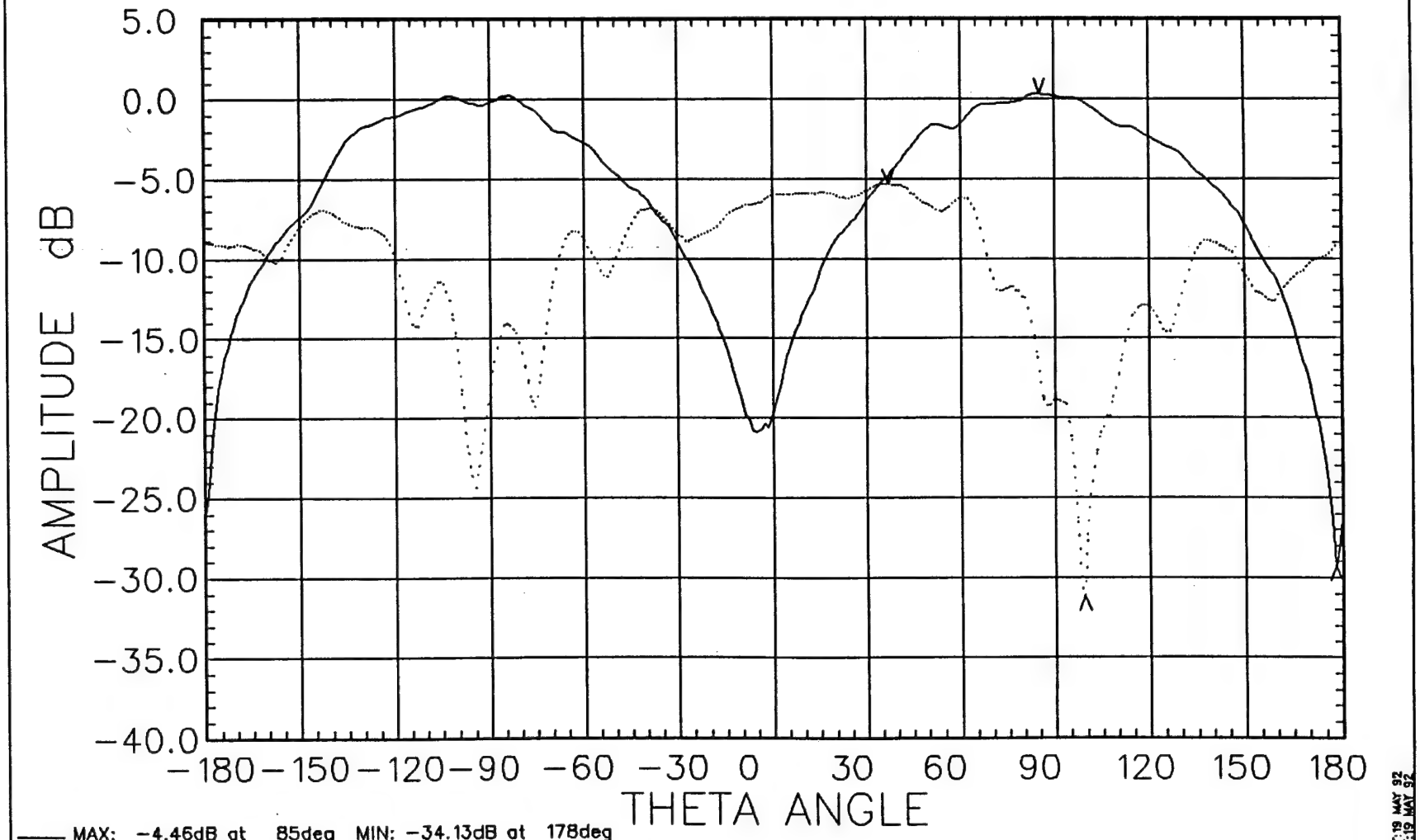

AZIMUTH
17 DEC 92
TAGGANT LETTER W
BALL AEROSPACE
—— is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.84dB DF1201 HAS 0dB IF ATTEN SOURCE= 0deg V
. . . . is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 6.35dB DF1211 HAS 0dB IF ATTEN SOURCE= 90deg H
AMPLITUDE dB
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: -4.38dB at -82deg MIN: -36.00dB at 179deg
. . . . MAX: -9.85dB at 31deg MIN: -32.19dB at 103deg
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

AZIMUTH
17 DEC 92

TAGGANT LETTER W

BALL AEROSPACE

—— is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.80dB DF1202 HAS 0dB IF ATTEN SOURCE= 0deg V
. . . . is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.26dB DF1212 HAS 0dB IF ATTEN SOURCE= 90deg H



—— MAX: -4.46dB at 85deg MIN: -34.13dB at 178deg
. . . . MAX: -10.56dB at 37deg MIN: -36.42dB at 99deg

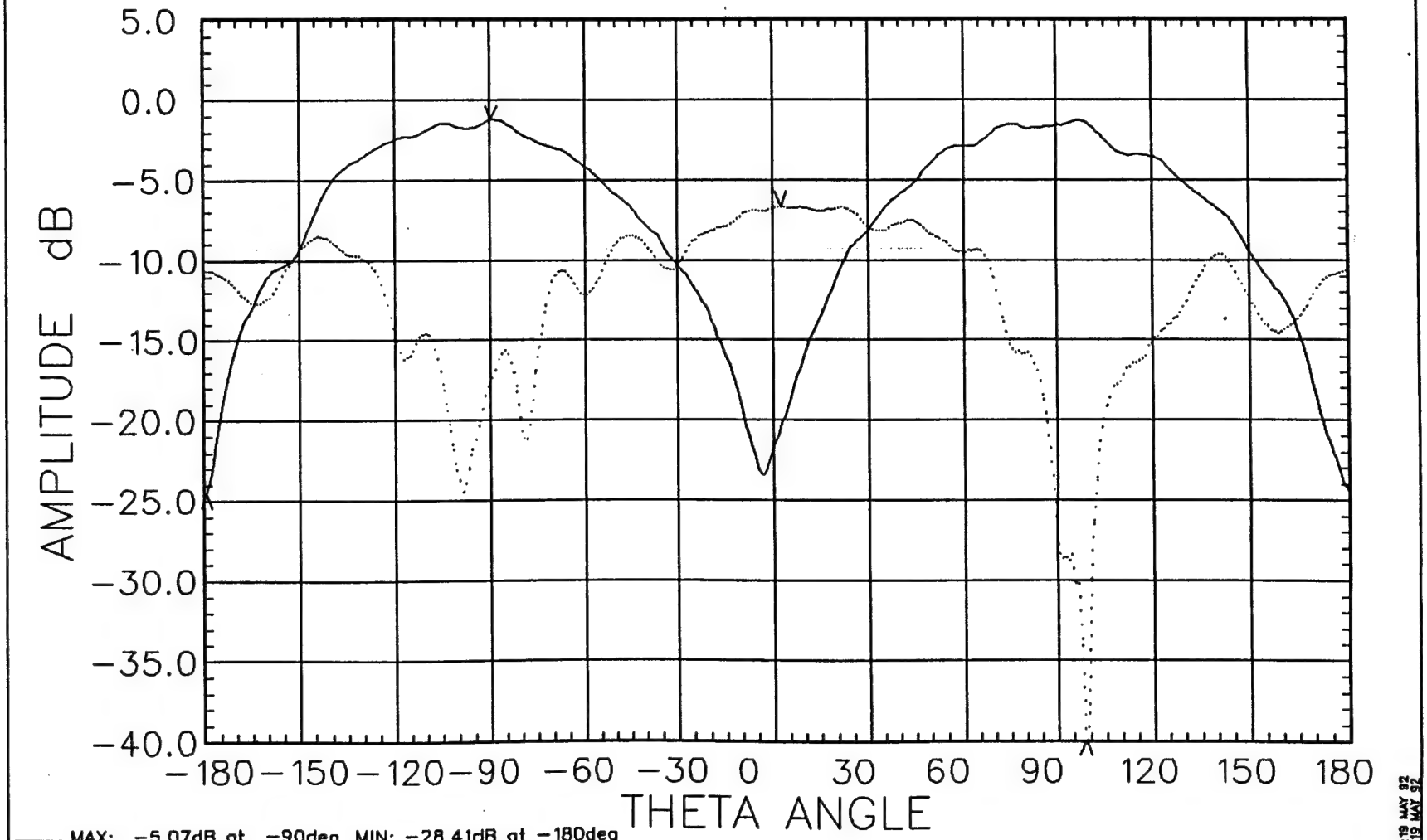
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

AZIMUTH
17 DEC 92

TAGGANT LETTER W

BALL AEROSPACE

—— is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 3.84dB DF1203 HAS 0dB IF ATTEN SOURCE= 0deg ✓
. . . . is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.27dB DF1213 HAS 0dB IF ATTEN SOURCE= 90deg μ



—— MAX: -5.07dB at -90deg MIN: -28.41dB at -180deg
. . . . MAX: -10.91dB at 3deg MIN: -45.32dB at 98deg

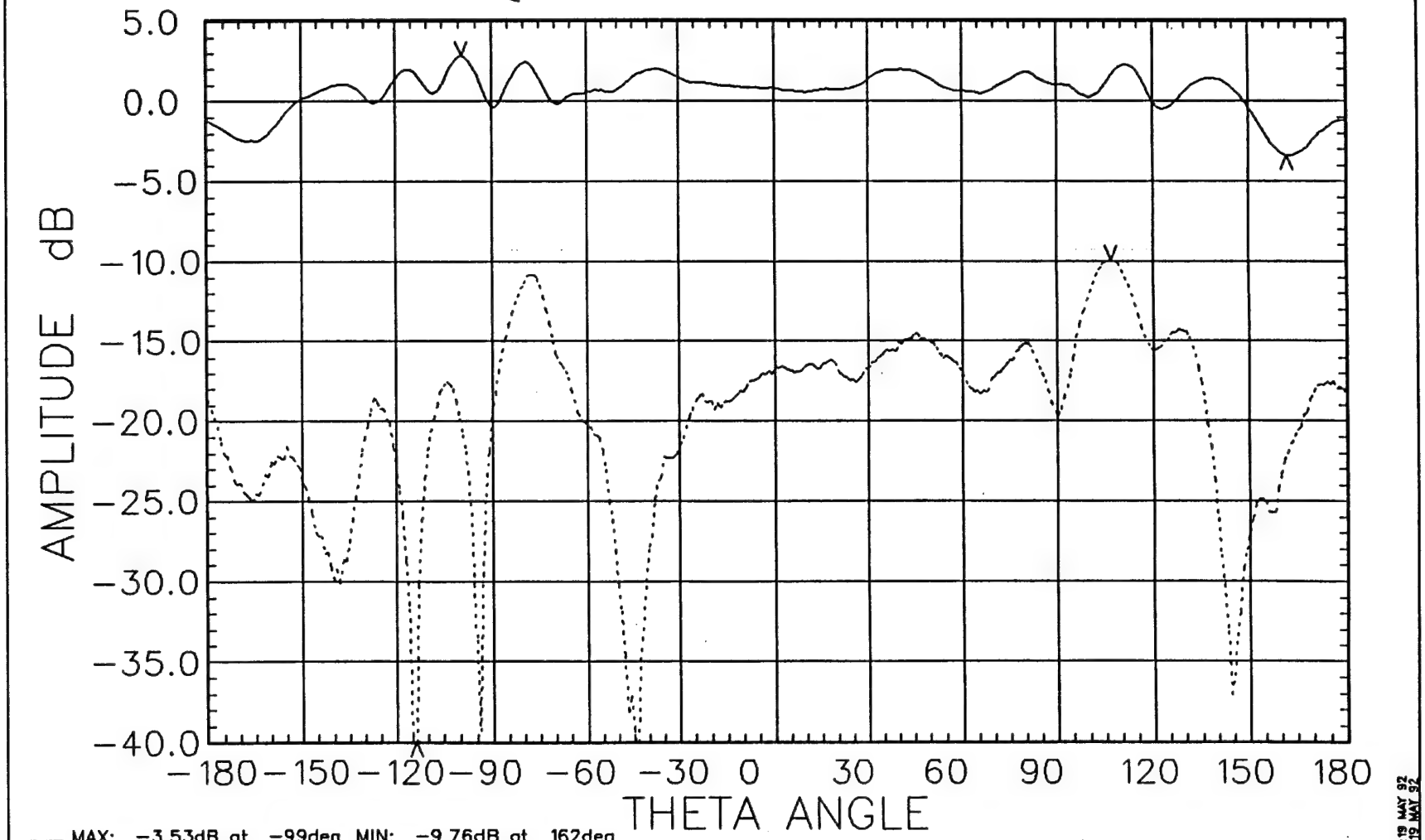
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

ELEVATION
17 DEC 92

TAGGANT LETTER W

BALL AEROSPACE

—— is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 6.35dB DF1221 HAS 0dB IF ATTEN SOURCE= 90deg H
----- is 860MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.84dB DF1231 HAS 0dB IF ATTEN SOURCE= 0deg ✓



—— MAX: -3.53dB at -99deg MIN: -9.76dB at 162deg
----- MAX: -15.78dB at 107deg MIN: -49.74dB at -114deg

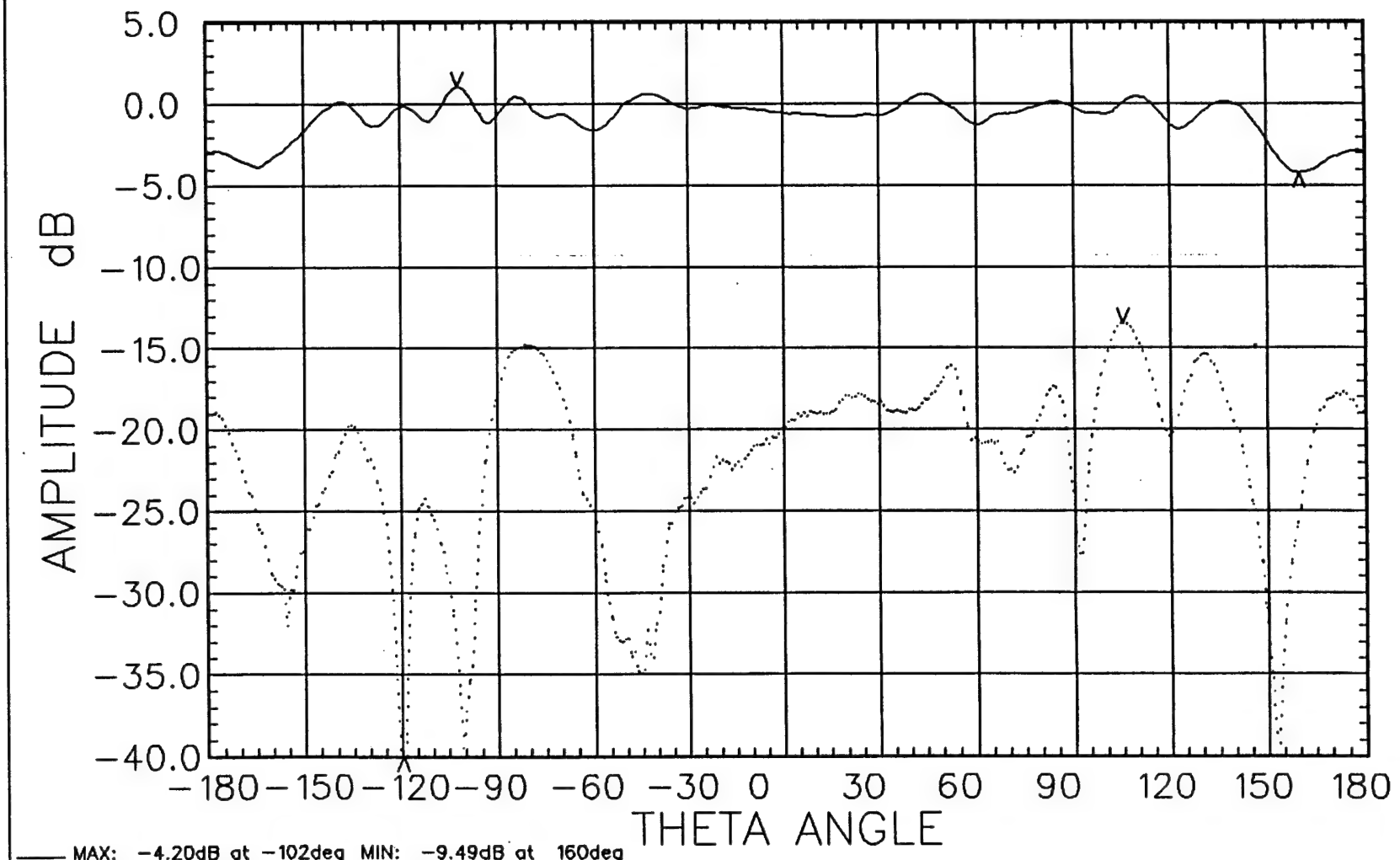
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

ELEVATION
17 DEC 92

TAGGANT LETTER W

BALL AEROSPACE

—— is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 5.26dB DF1222 HAS 0dB IF ATTEN SOURCE= 90deg H
. . . . is 880MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.80dB DF1232 HAS 0dB IF ATTEN SOURCE= 0deg V



—— MAX: -4.20dB at -102deg MIN: -9.49dB at 160deg
. . . . MAX: -18.27dB at 105deg MIN: -58.43dB at -120deg

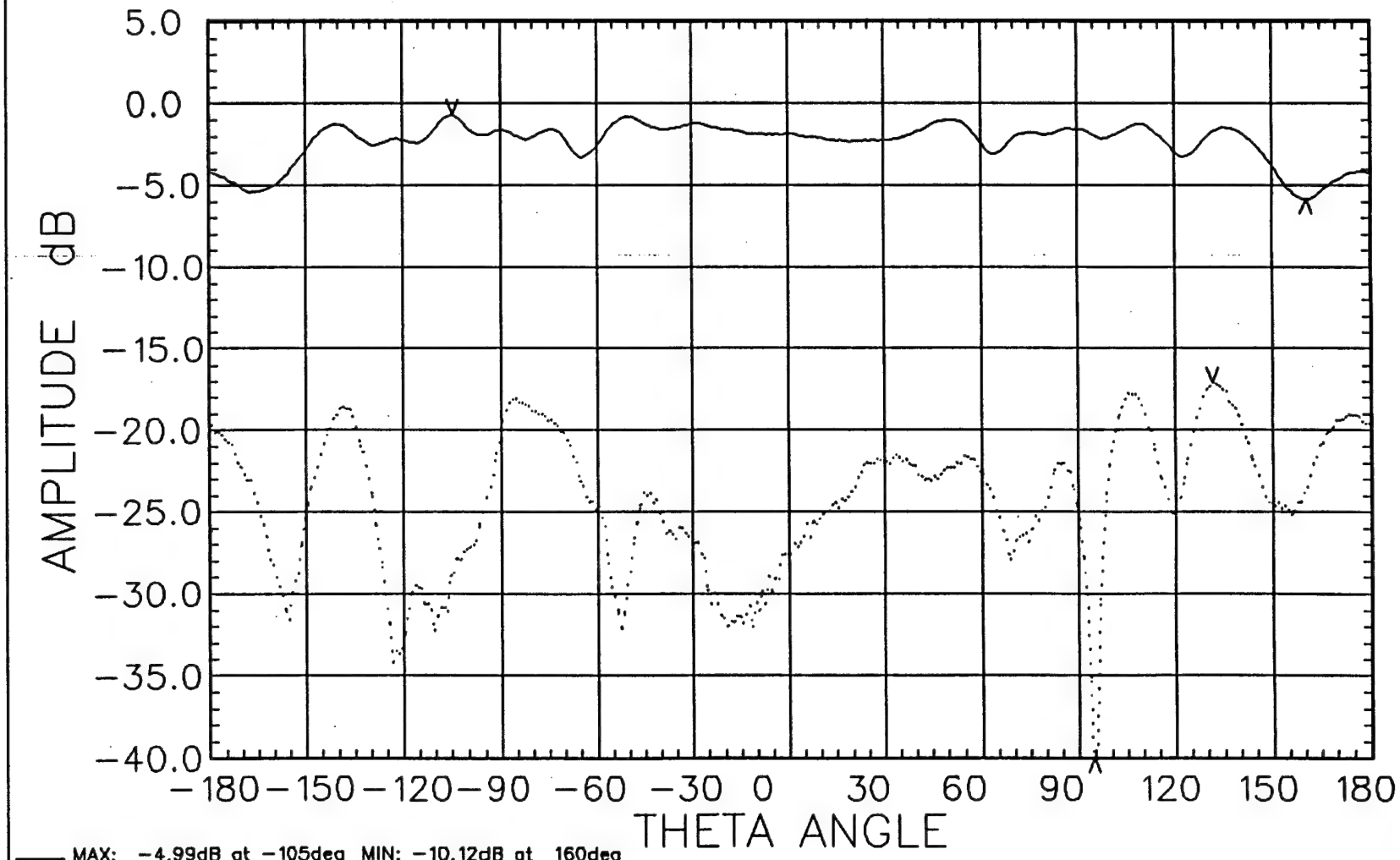
2) RPLOT:19 MAY 92
1) RPLOT:19 MAY 92

ELEVATION
17 DEC 92

TAGGANT LETTER W

BALL AEROSPACE

—— is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 4.27dB DF1223 HAS 0dB IF ATTEN SOURCE= 90deg ||
. . . . is 900MHz A-AMPLITUDE PHI= 0deg NORMALIZED BY 3.84dB DF1233 HAS 0dB IF ATTEN SOURCE= 0deg ✓



—— MAX: -4.99dB at -105deg MIN: -10.12dB at 160deg
. . . . MAX: -20.91dB at 131deg MIN: -46.09dB at 94deg

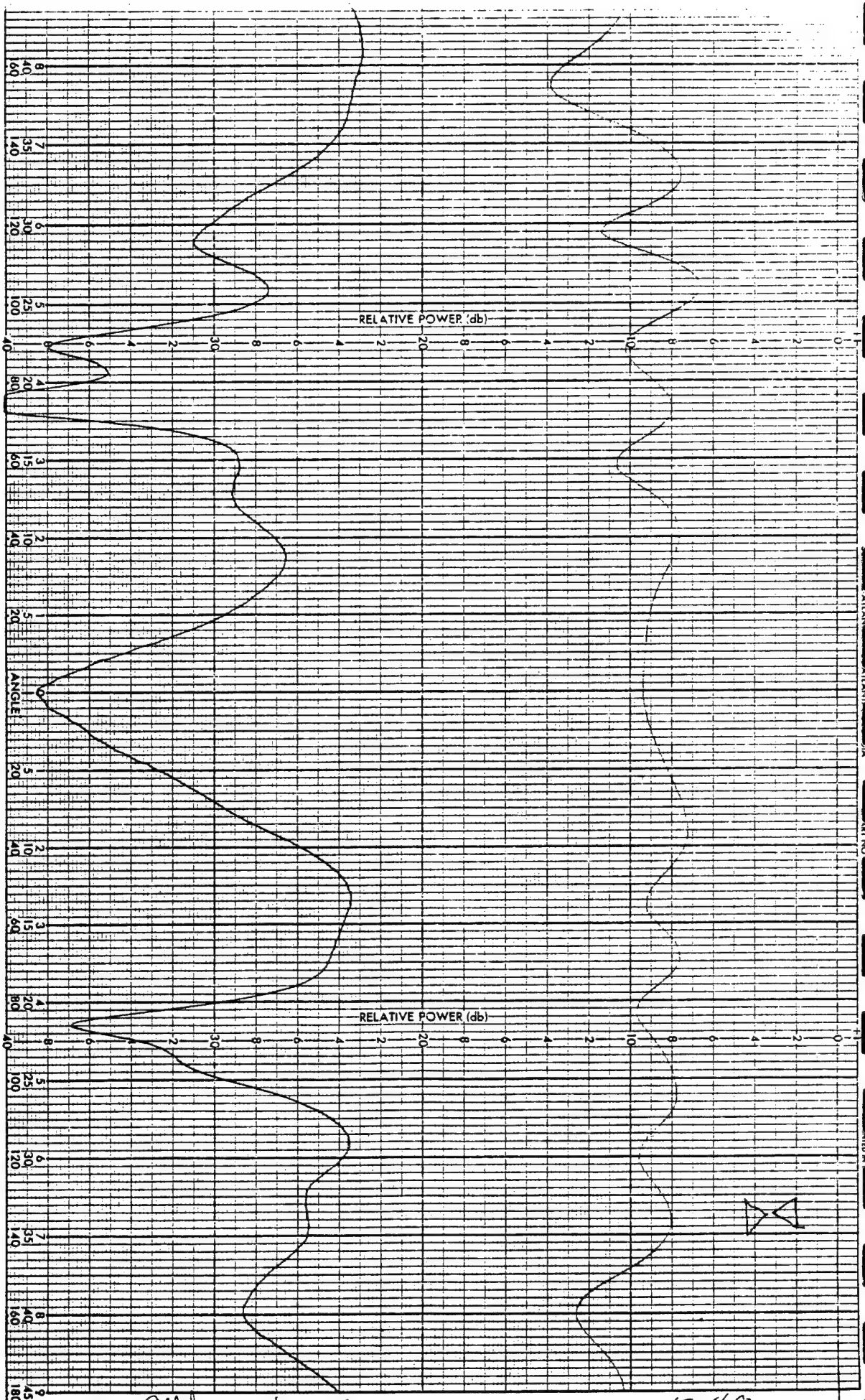
2) REPLOT:19 MAY 92
1) REPLOT:19 MAY 92

Appendix II

Argos Bowtie Antenna

Argos 401 MHz 90° Bowtie Antenna

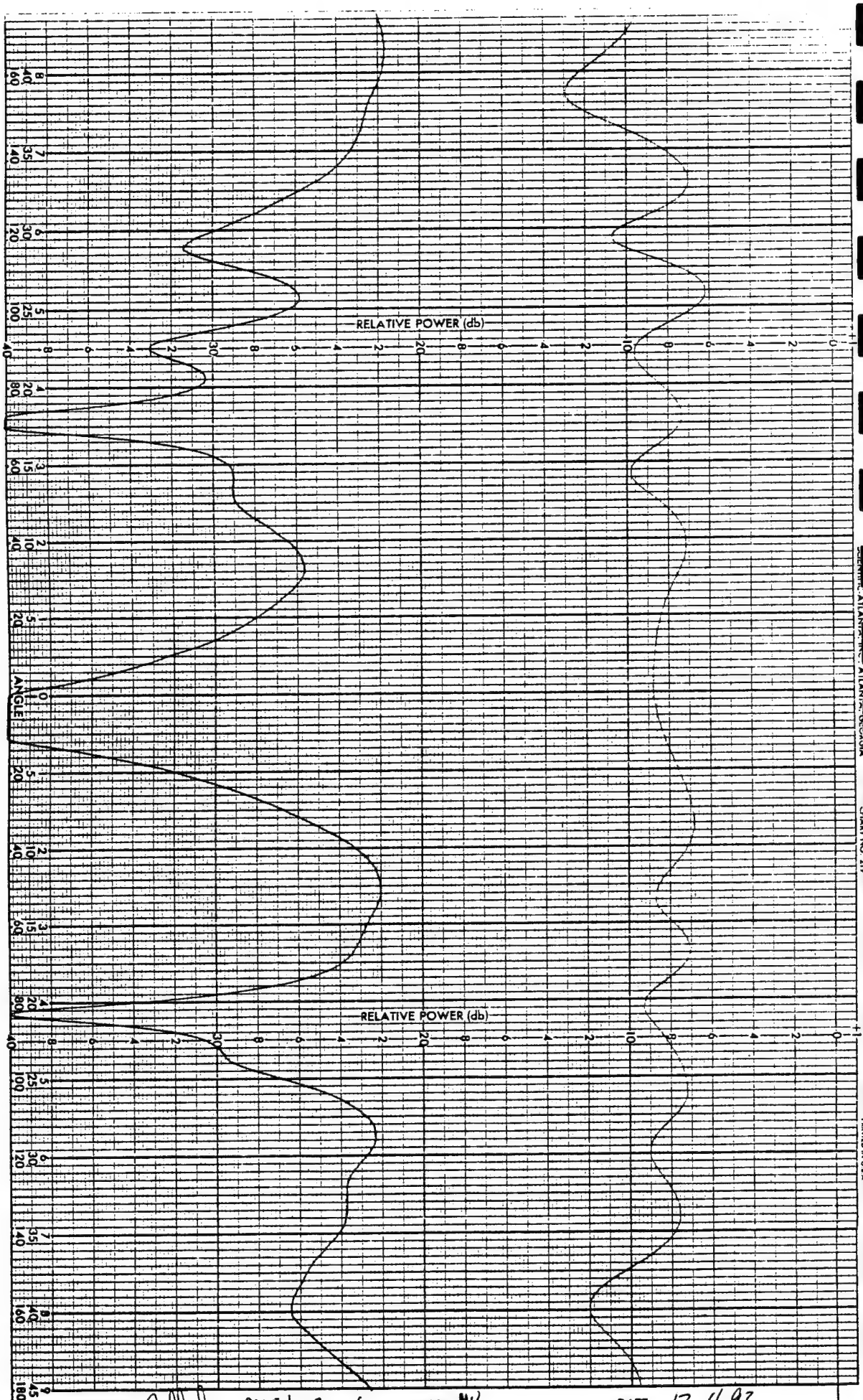
Freq	SG LPDA on chart	0dB on chart	Gain (dBi) H	Gain (dBi) V
391	-3.0	-11.0	+2.2	-10.8
401	-2.4	-10.4	+1.5	-10.6
411	-2.8	-10.8	+1.6	-10.7



PROJECT Cellular 90° Bowtie ENGR BI=Hon DATE 12-11-92

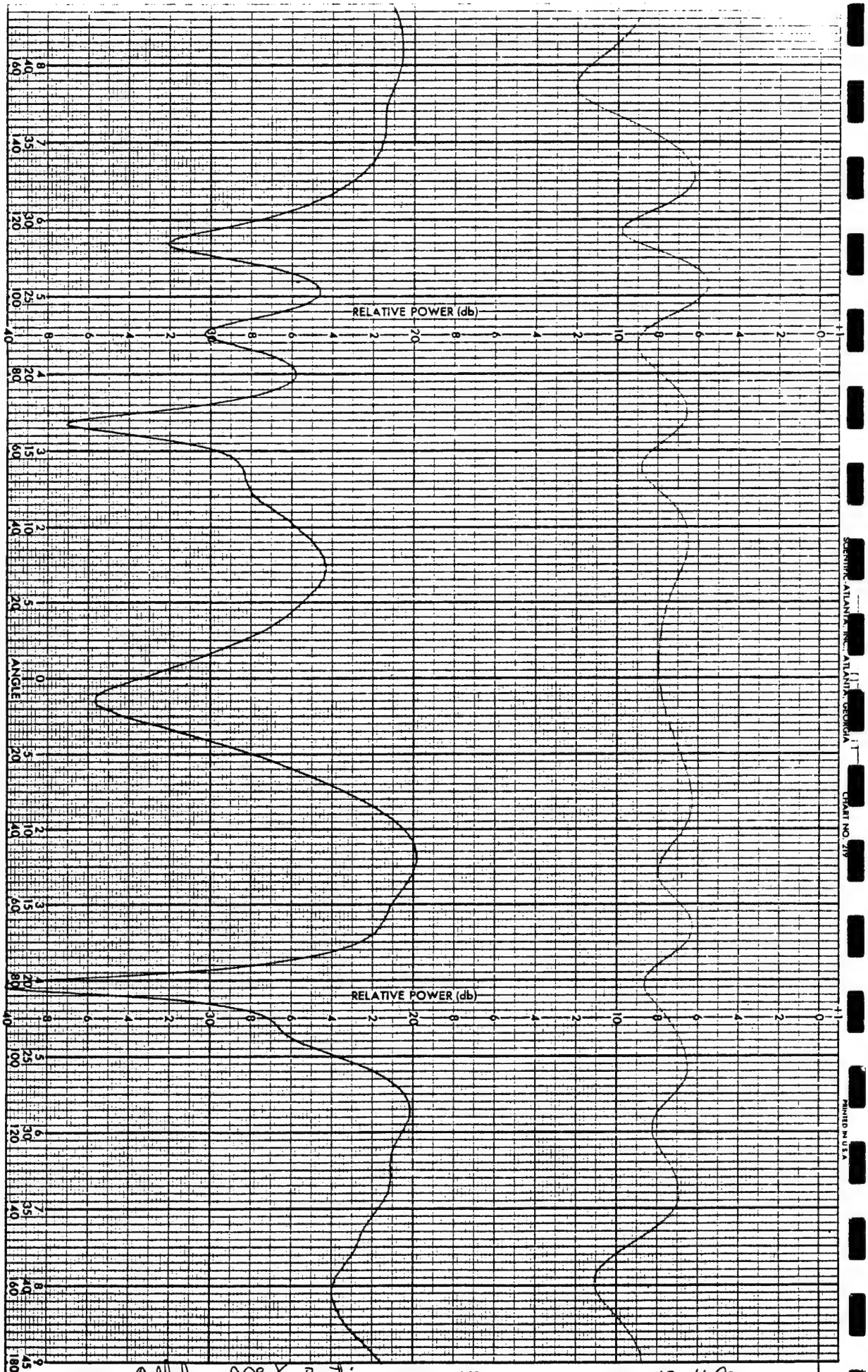
REMARKS 890 MHz A=10

106743



PROJECT Cellular 90° & Bowtie ENGR MU DATE 12-11-92

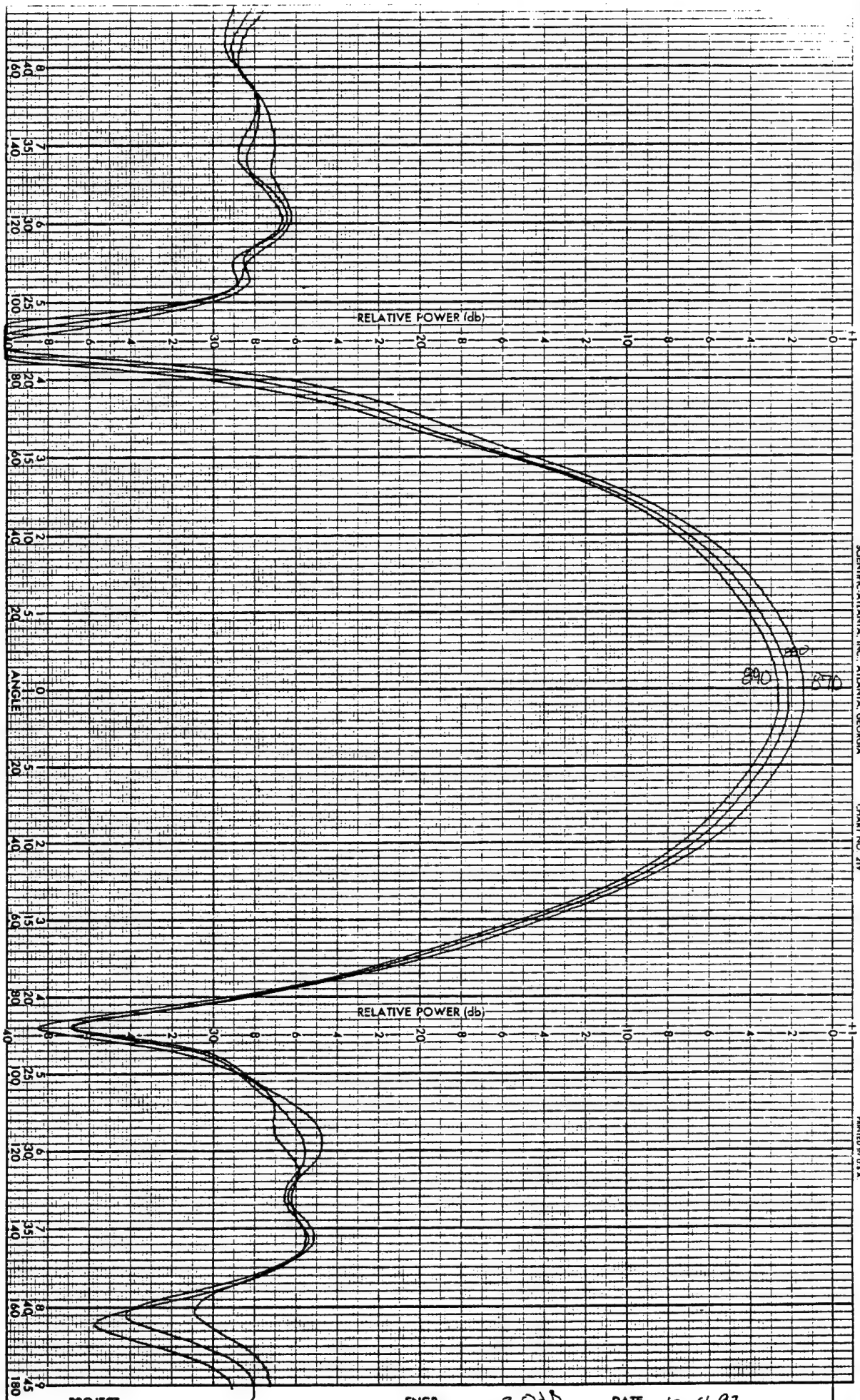
REMARKS 880 MHz B1=H= A-10 106744



PROJECT Cellular 90° X Doublet ENGR MO DATE 12-11-92

REMARKS 870 MHz B1=Horn A=10

106745



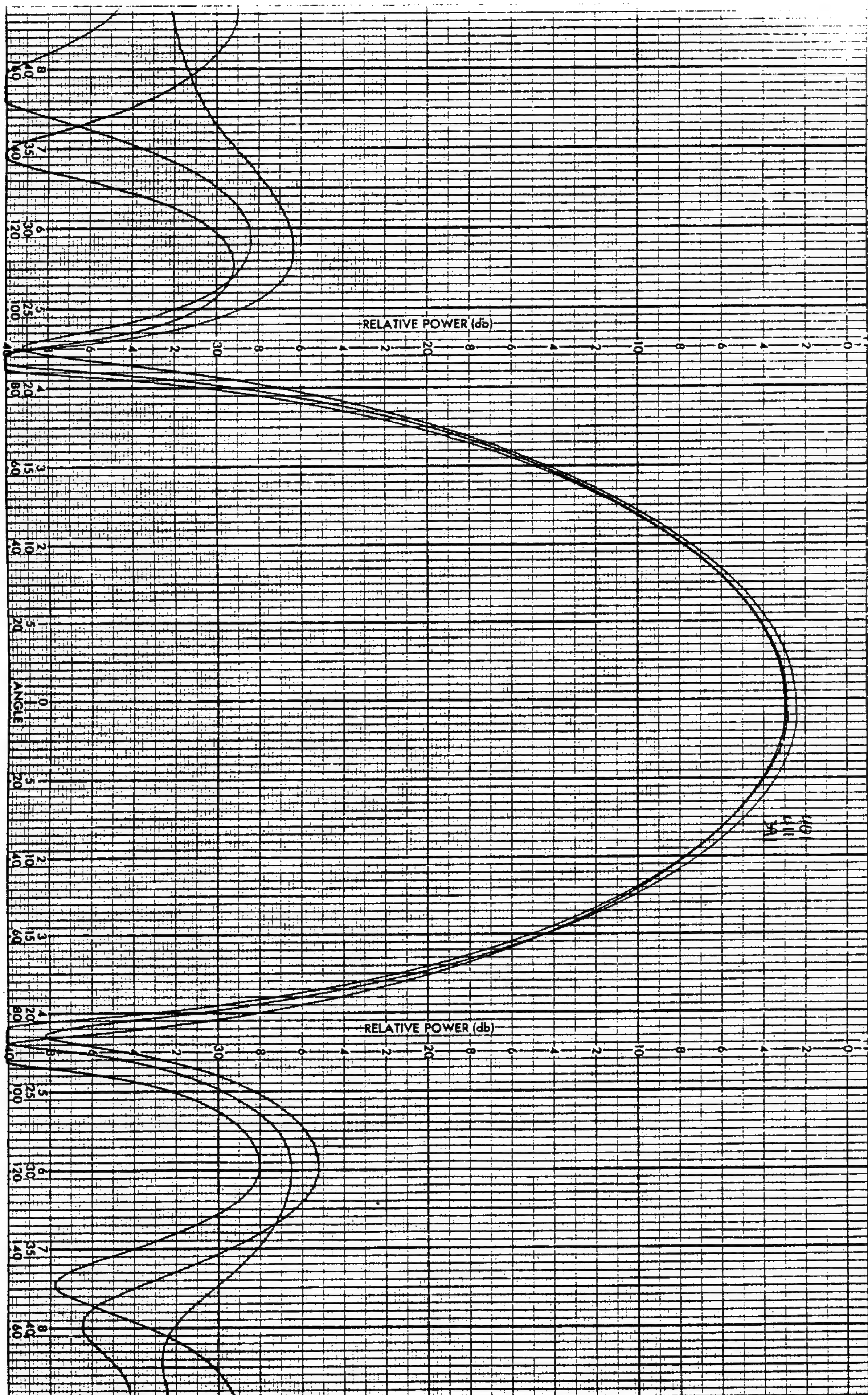
PROJECT

REMARKS Post ~~Depole~~ Cross Log Cairns

ENGR +8.0dB

DATE 12-11-92

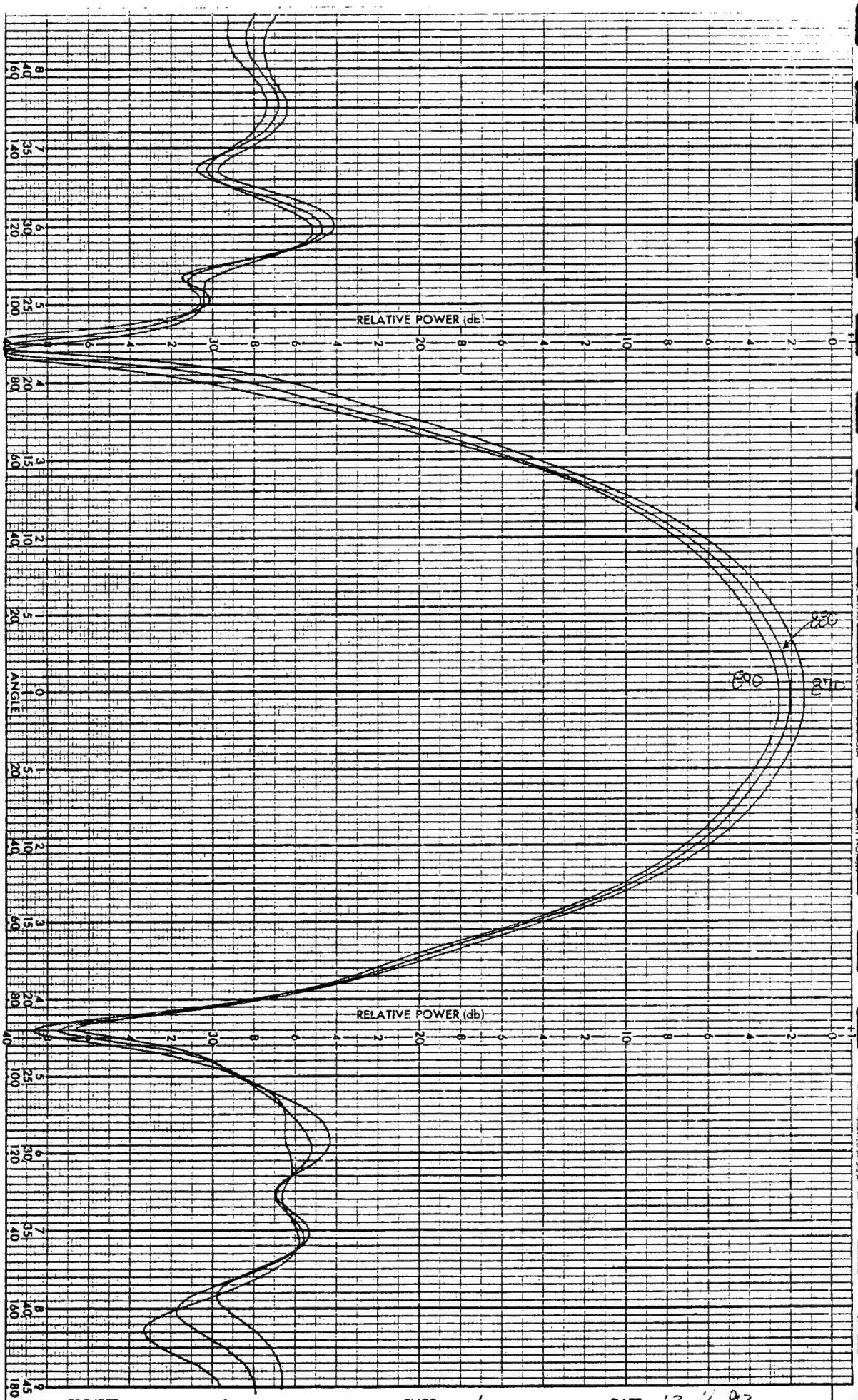
A-D 106746

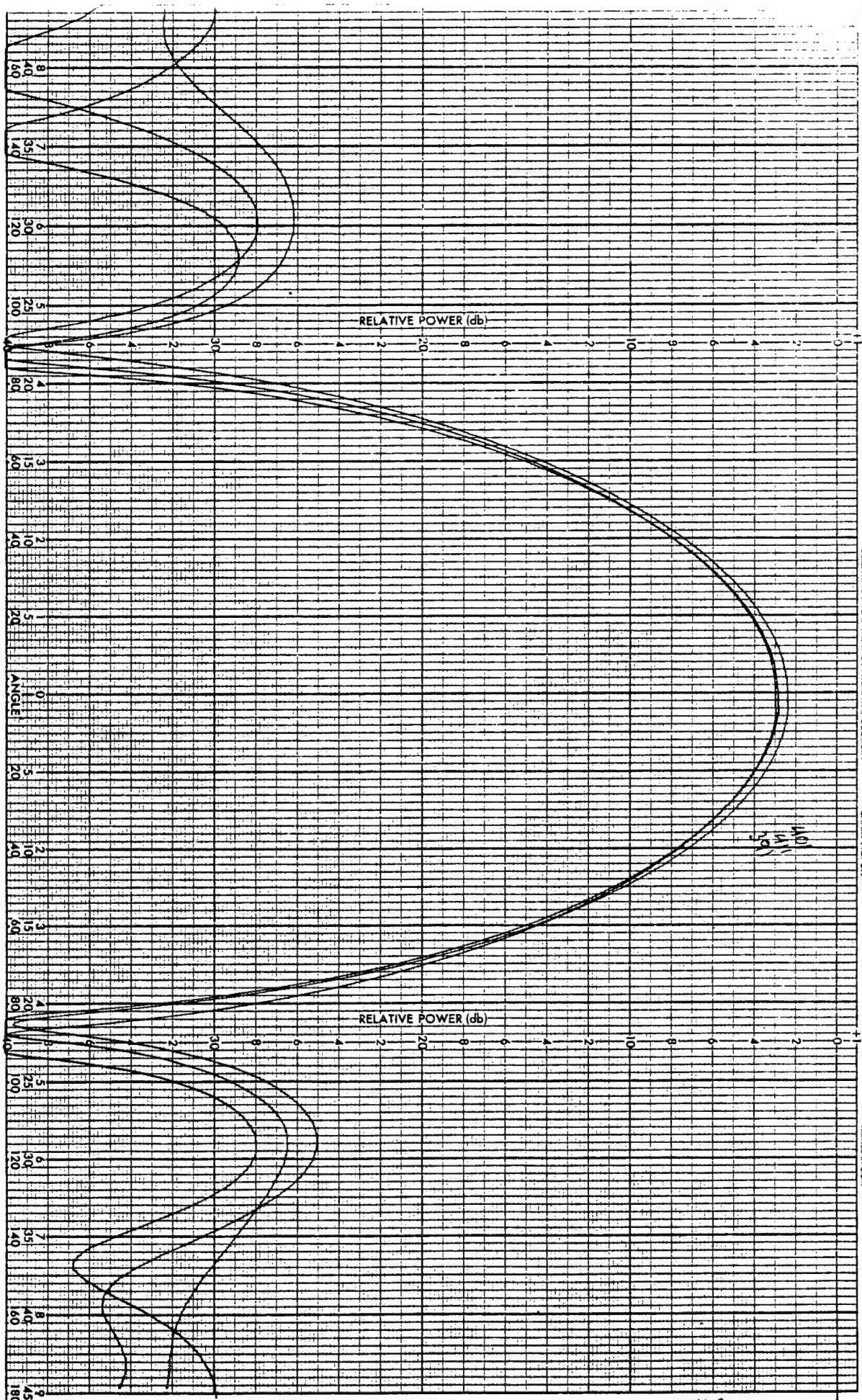


PROJECT ENGR DATE 12-11-92

REMARKS Post Cross Coa Chains

106747

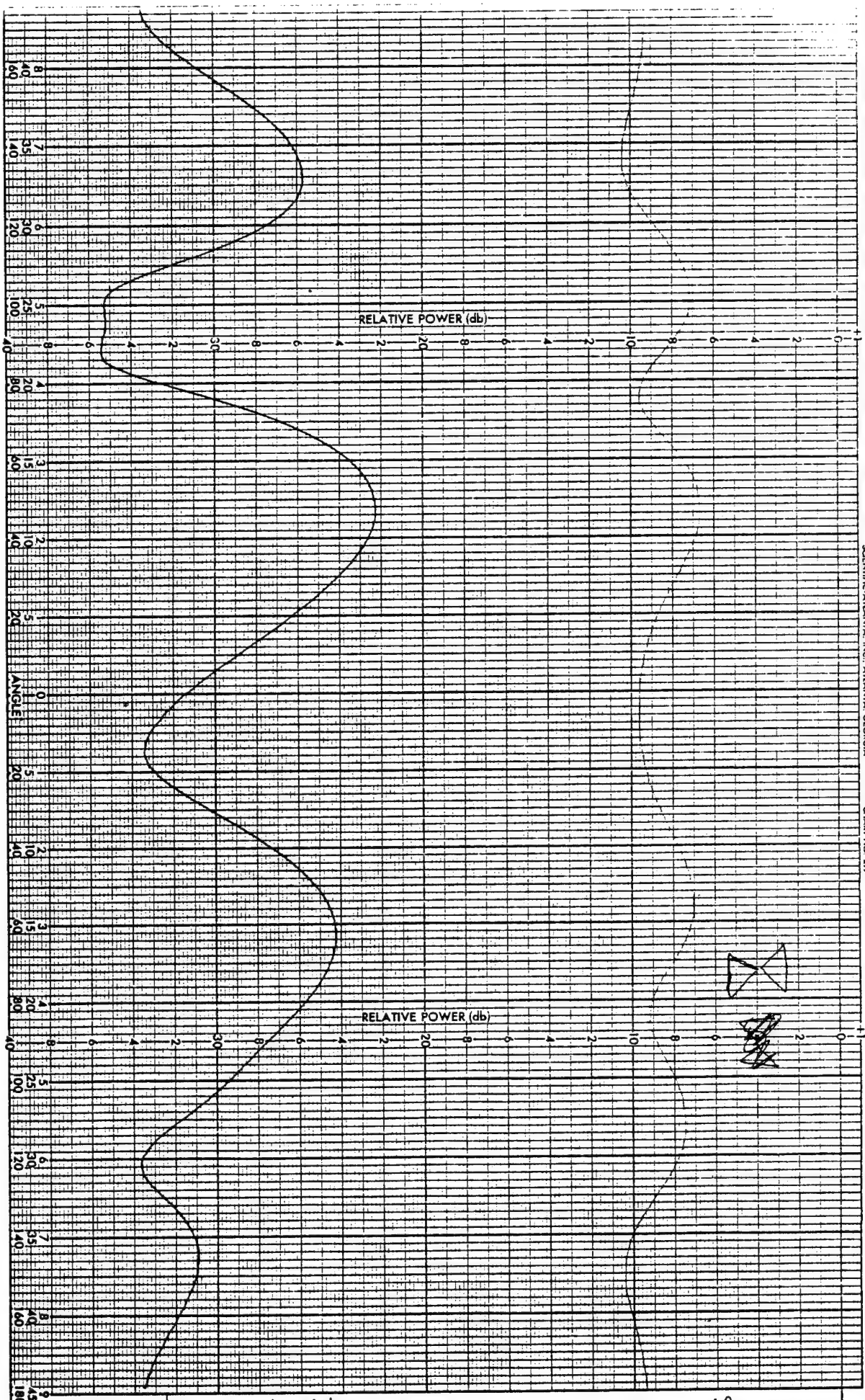

RELATIVE POWER (db)
ANGLE
RELATIVE POWER (db)
PROJECT
REMARKS
Cellular
ENGR
Hor.
DATE
12-1-92
107159



PROJECT Argos ENGR Hor DATE 12-11-92

REMARKS Cross Pol std Gain 4=20

107161



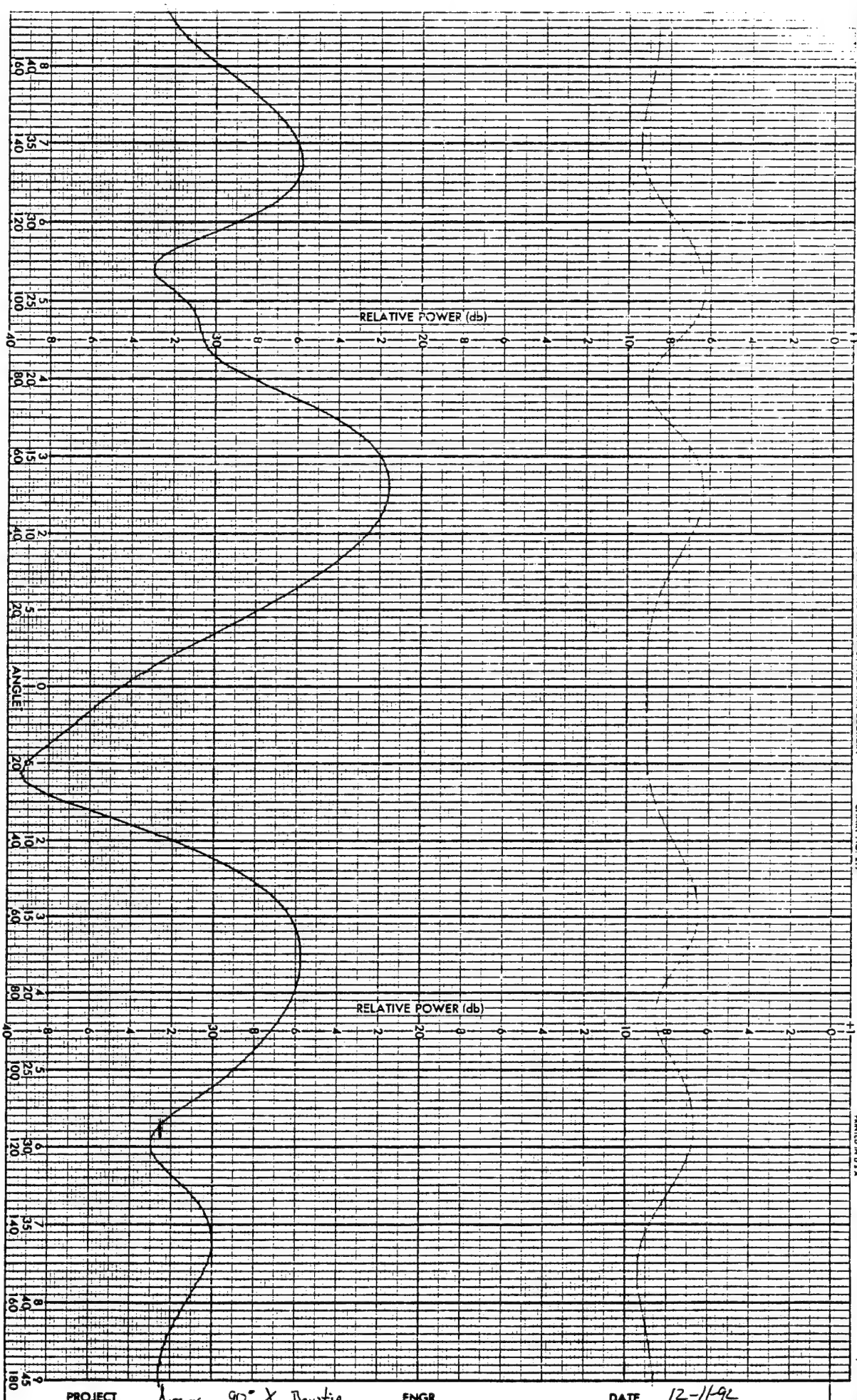
PROJECT REMARKS Argos 90° & Dotothe 391 MHz

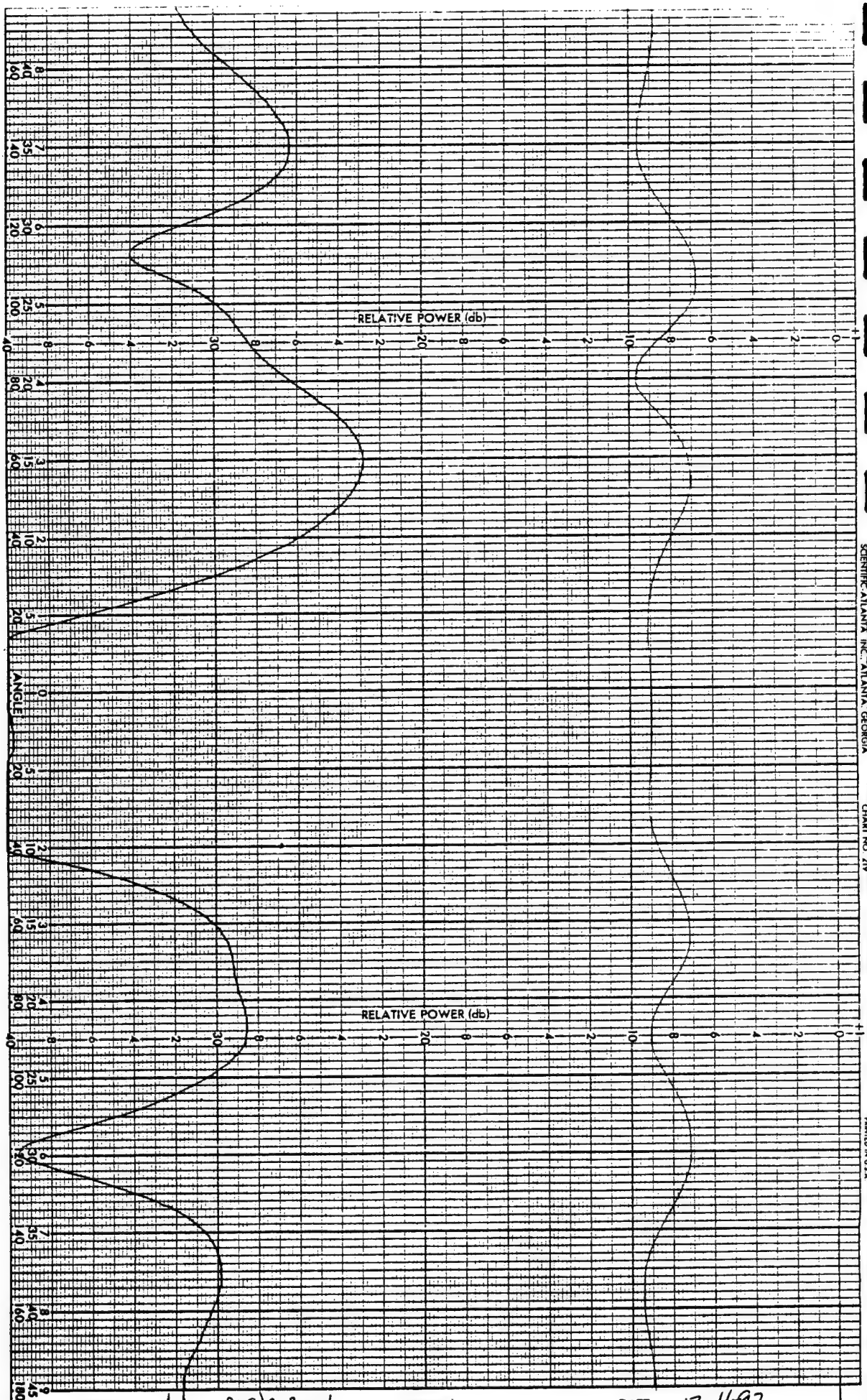
ENGR B1=Hor

DATE 12-1-92

A=20

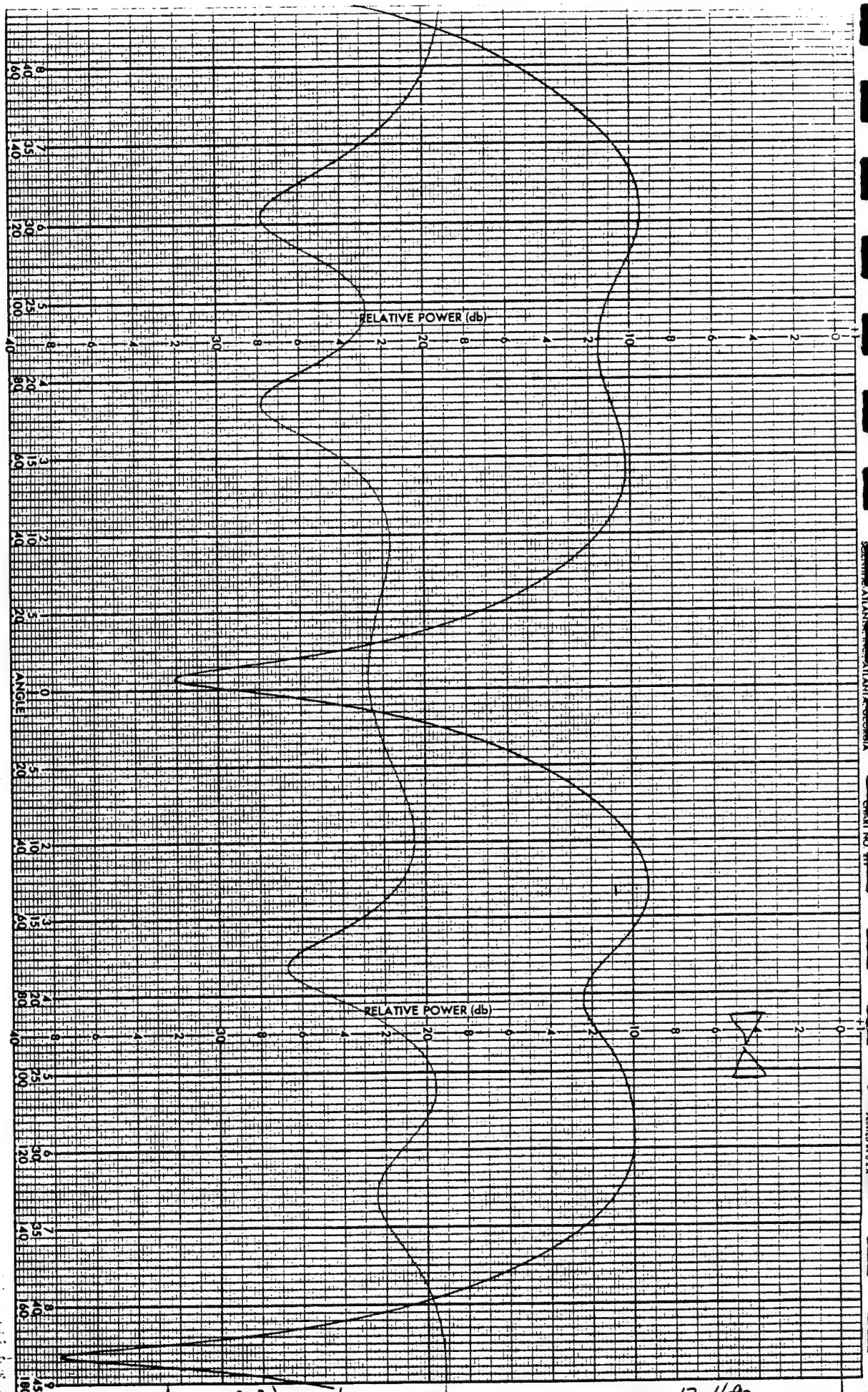
107162

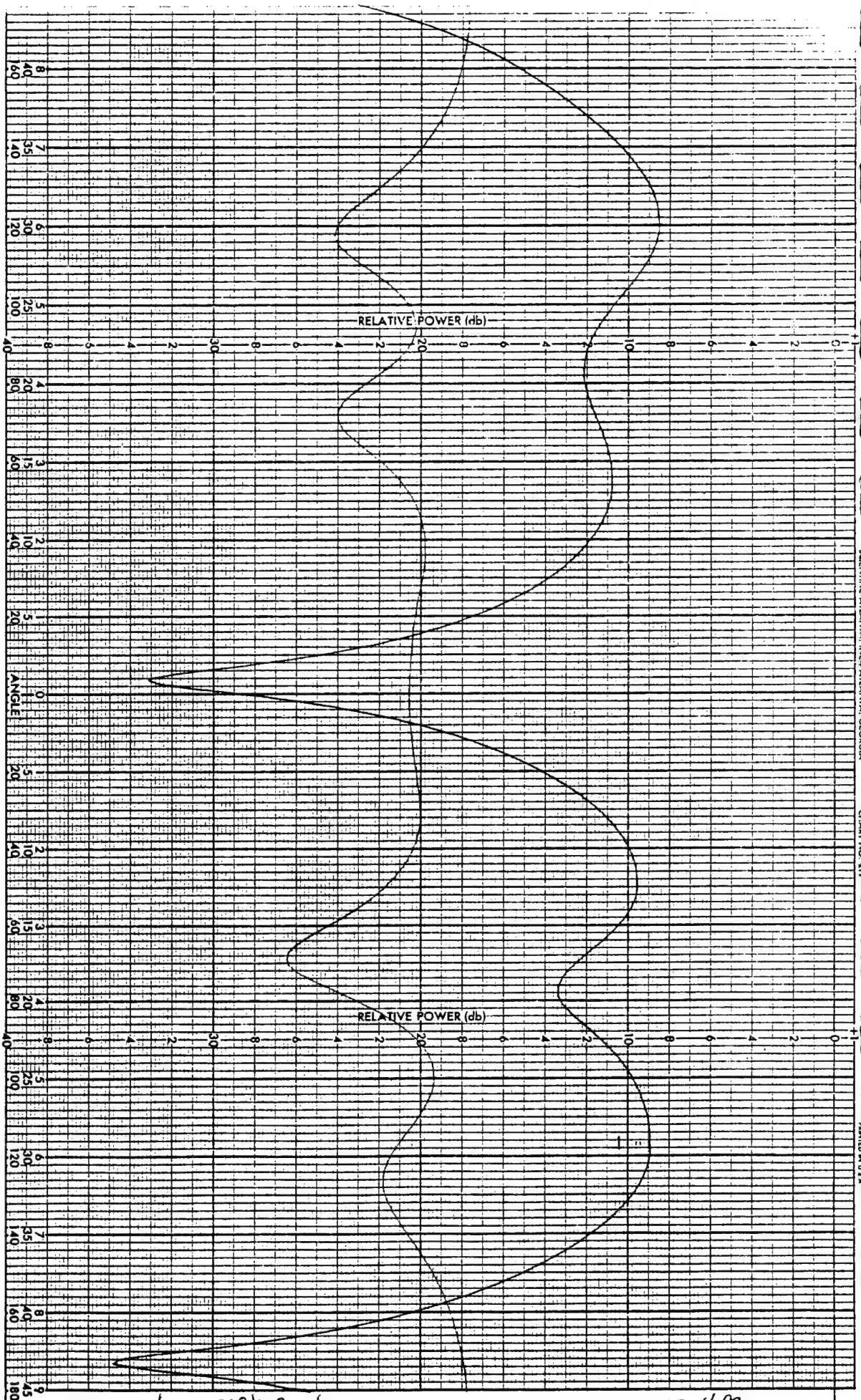

RELATIVE POWER (db)
ANGLE
RELATIVE POWER (db)
PROJECT
Argos 90° X Dbutie
ENGR
DATE 12-1-92
REMARKS
401MHz
B1=Hor
A=20
107163
SCIENTIFIC-ATLANTA, INC., ATLANTA, GEORGIA
CHART NO. 219
PRINTED IN U.S.A.



PROJECT Argos 90°K Bowtie ENGR DATE 12-11-92

REMARKS 411 MHz B1=Hor A=20 107164

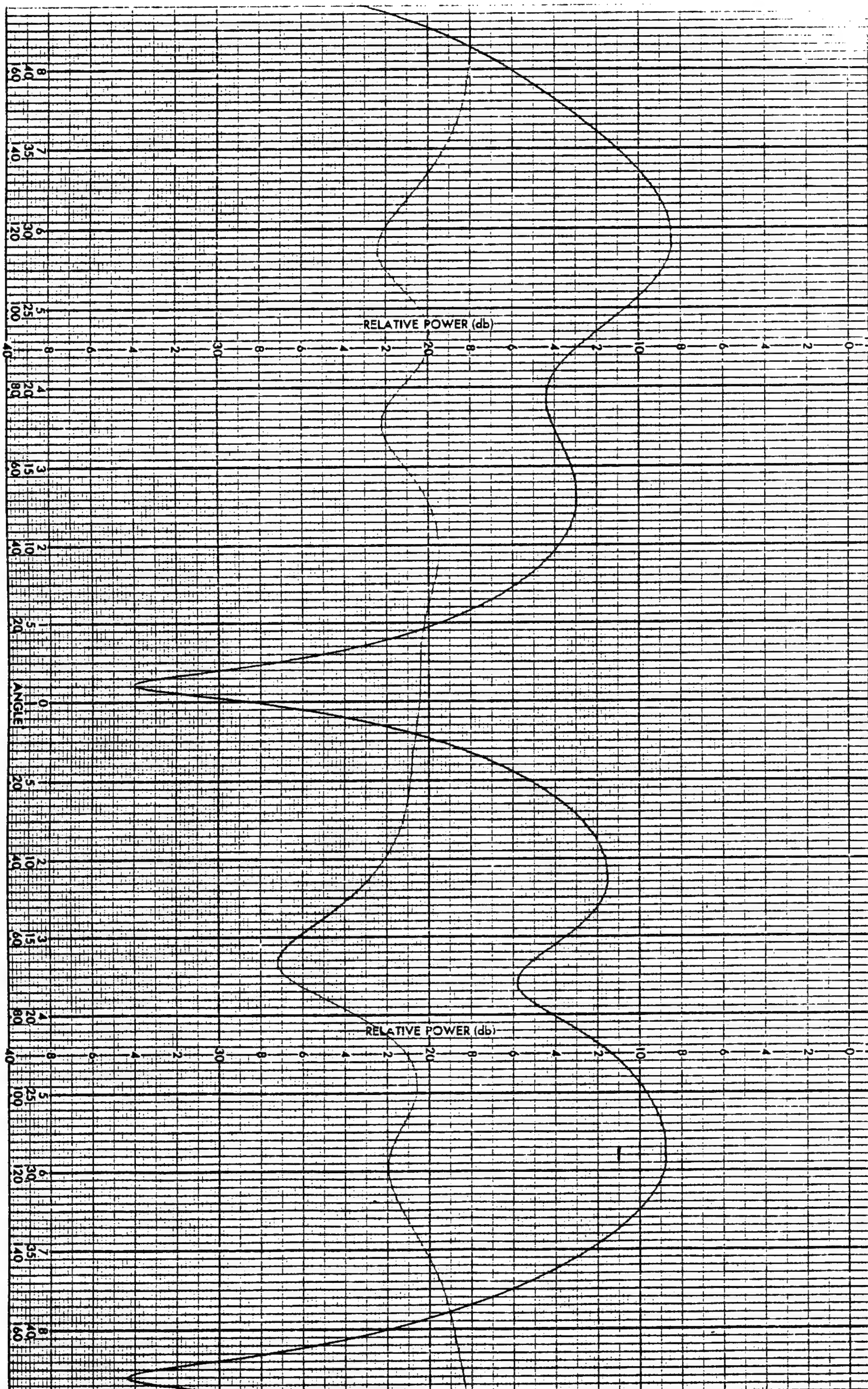

RELATIVE POWER (db)
ANGLE
RELATIVE POWER (db)
PROJECT
REMARKS
Argos 90° & Dowtre
411 Mtr
ENGR
Bl:Hon
DATE
12-11-92
A-20
107165



PROJECT Argos 90° & Bowtie ENGR B. Thom DATE 12-11-92

REMARKS 401MHz A=70

107166



PROJECT Argos 90°4 Bowtie | ENGR | DATE 12-11-92

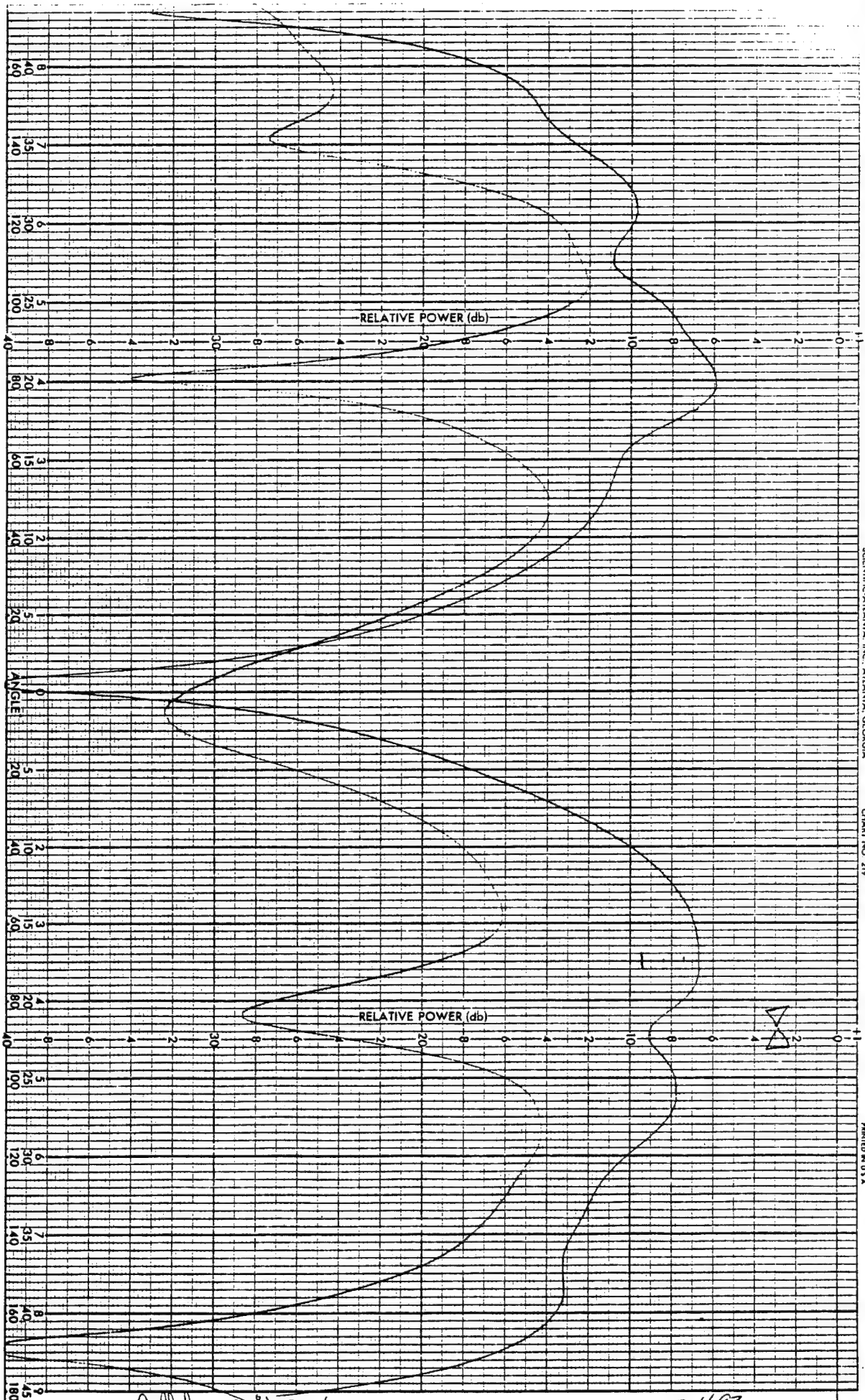
REMARKS 391MHz | D1=Hor | Δ=20 | 107167

Appendix III

Cellular Bowtie Antenna

Cellular 90° Biconic Antenna

Freq	SGH LPDA on chart	Odds axi chart	Gain (dBi) H	Gain (dBi) V
870	-1.4	-9.4	+2.7	-9.8
880	-2.2	-10.2	+3.0	-9.8
891	-2.6	-10.6	+3.0	-9.4



SCIENTIFIC-ATLANTA, INC., ATLANTA, GEORGIA

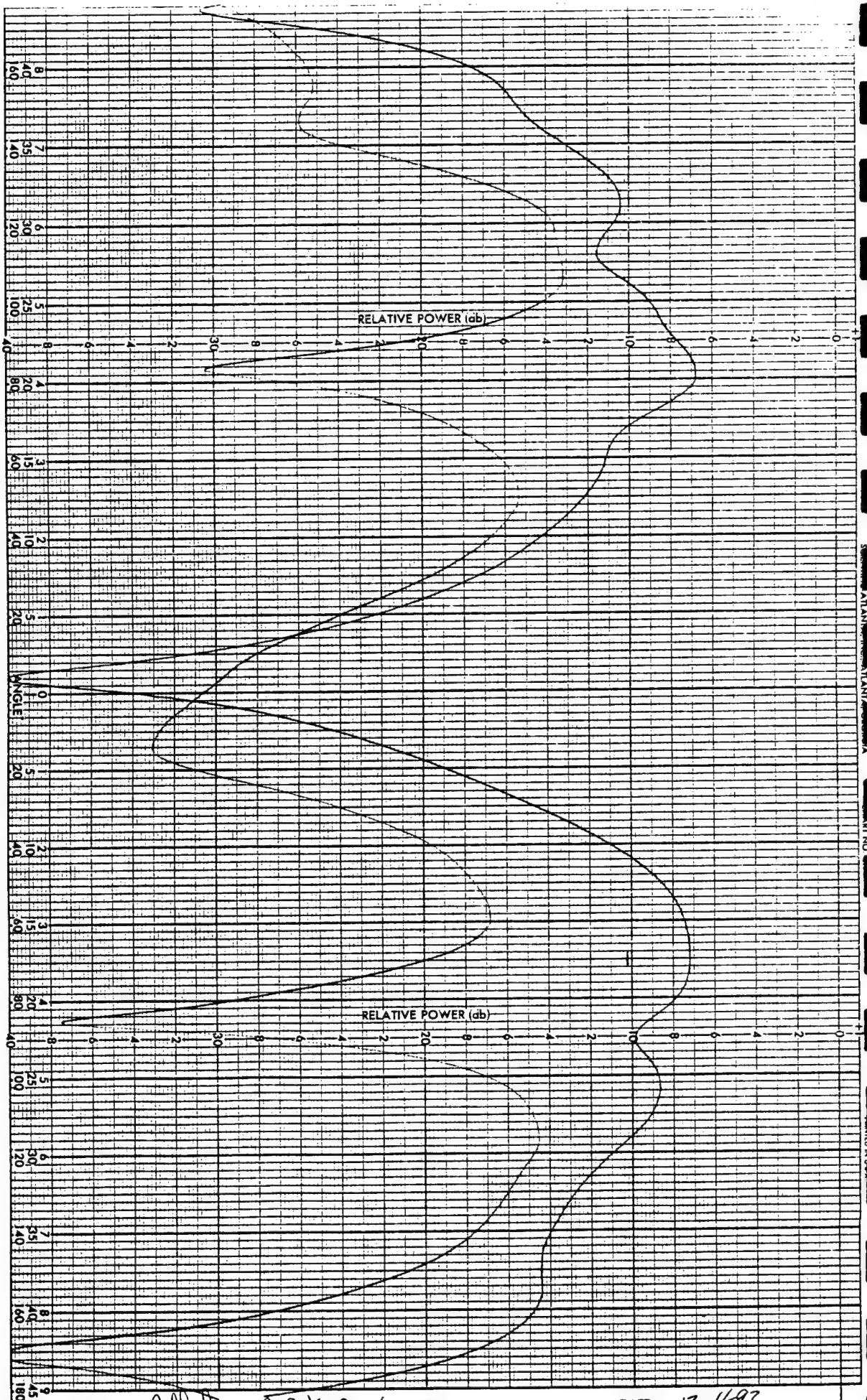
CHART NO. 219

PRINTED IN U.S.A.

PROJECT Cellular 90° Bowtie ENGR B1=Hor DATE 12-11-92

REMARKS 870 MHz A=10

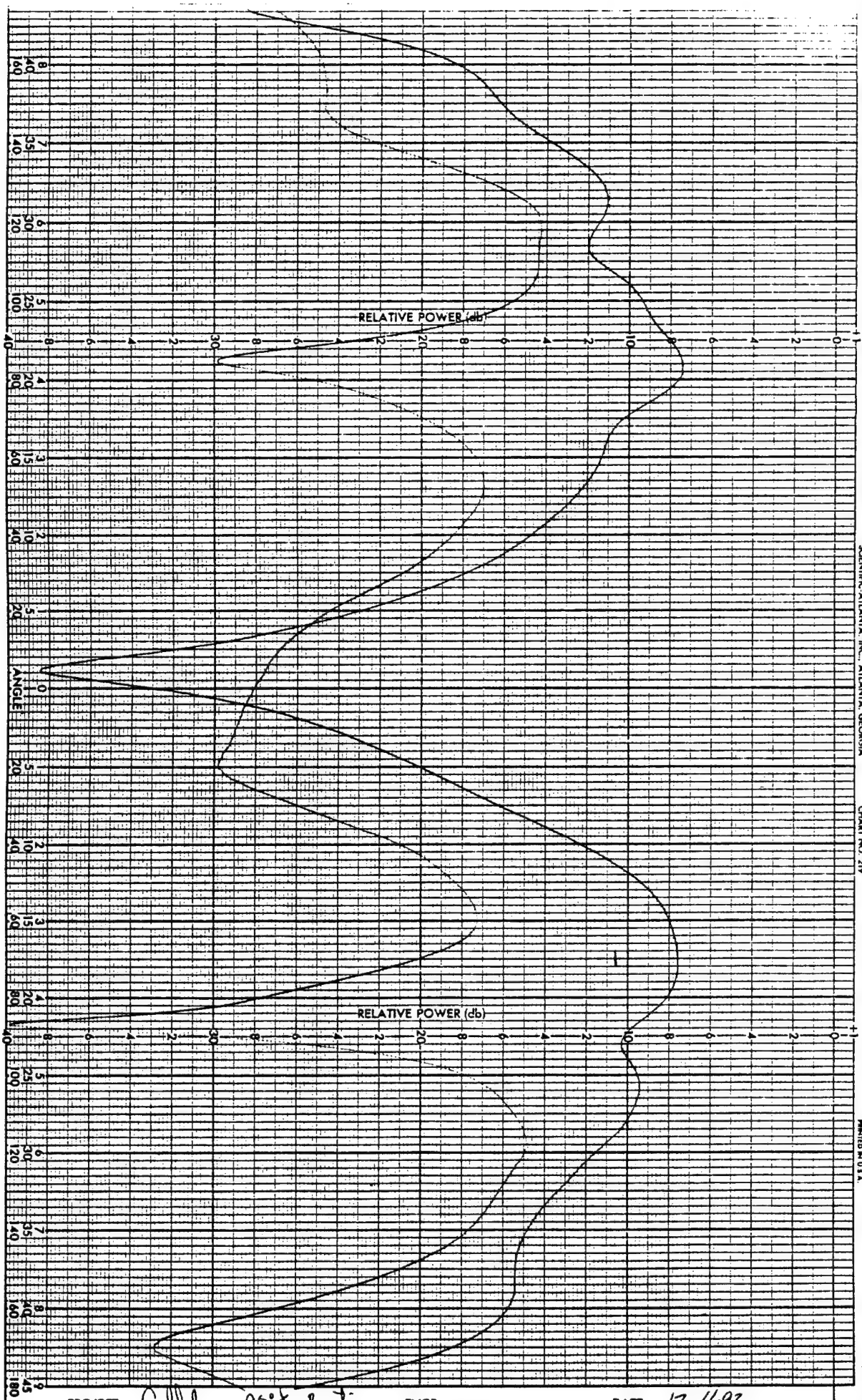
107168



PROJECT Collinear 90° & Bowtie ENGR B1=Hor DATE 12-11-92

REMARKS 880 MHz A=10

107169



PROJECT Cellular 90° & Brutie ENGR B1=Hor DATE 12-11-92

REMARKS 890MHz A=10

107170

Appendix IV

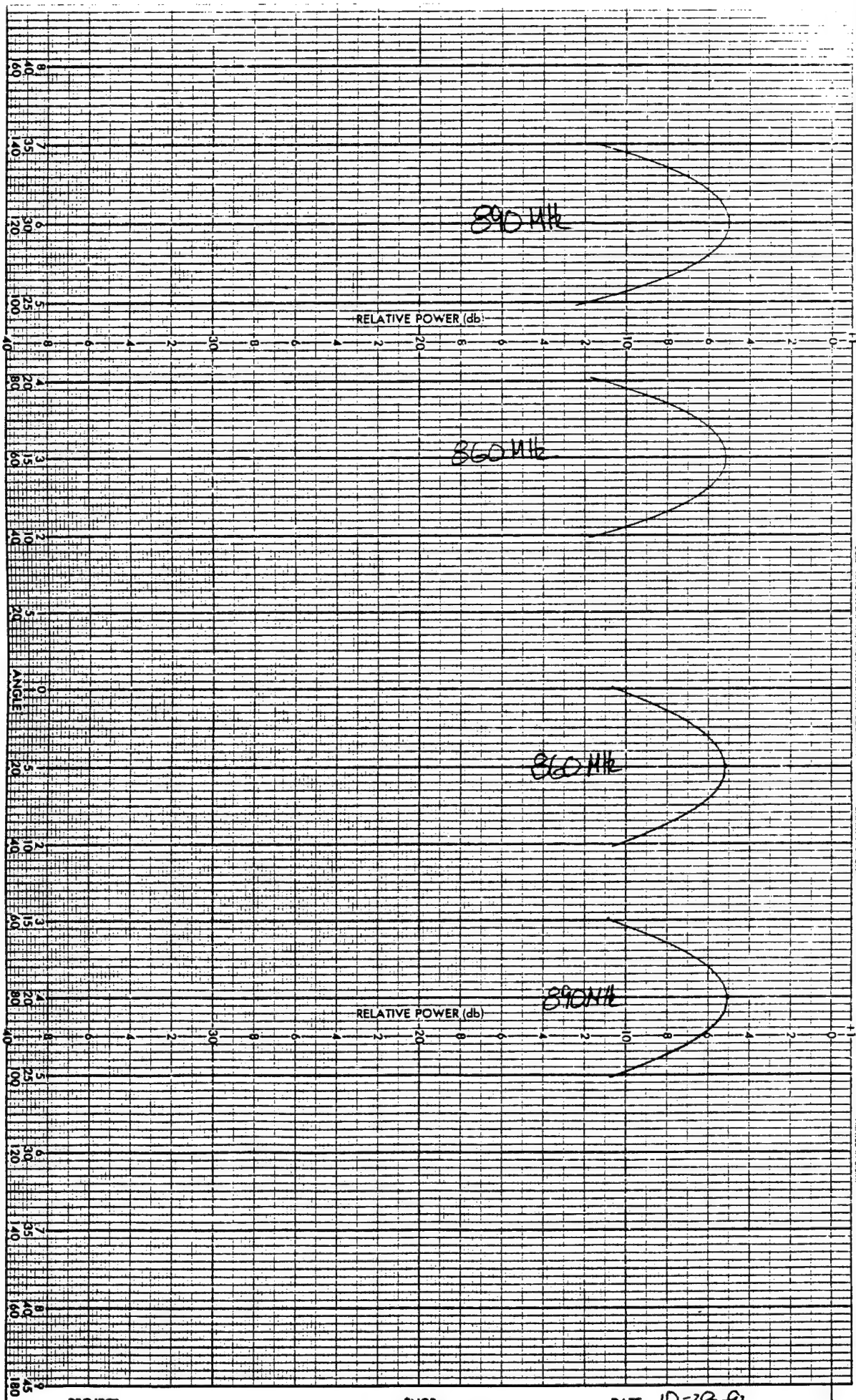
Cellular Bent Monopole Antenna

Cellular Bent Monopole — Data Take 10

Freq	SGH dBiL	SGH measured		OdBiL on chart		EL 0° gain		Az 0° gain	
		Hor	Ver	Hor	Ver	Hor	Ver	Hor	Ver
860	15.4	-5.3	-5.2	-10.7	-10.6	-25.1	3.15	3.20	-24.6
890	15.7	-5.15	-5.1	-10.85	-10.8	-24.05	2.15	2.25	-24.5

Cellular Bow Tie (30°)

Freq	SGH dBiL	SGH measured		OdBiL on chart		EL 0° gain		Az 90° gain	
		Hor	Ver	Hor	Ver	Hor	ver	Hor	Ver
860	15.4	-5.3	-5.2	-10.7	-10.6	-28.10	+1.65	1.30	-19.7
890	15.7	-5.15	-5.1	-10.85	-10.8	-23.05	+.75	1.20	-18.0



SCIENTIFIC-ATLANTA, INC. ATLANTA, GEORGIA — CHART NO. 219 — PRINTED IN U.S.A.

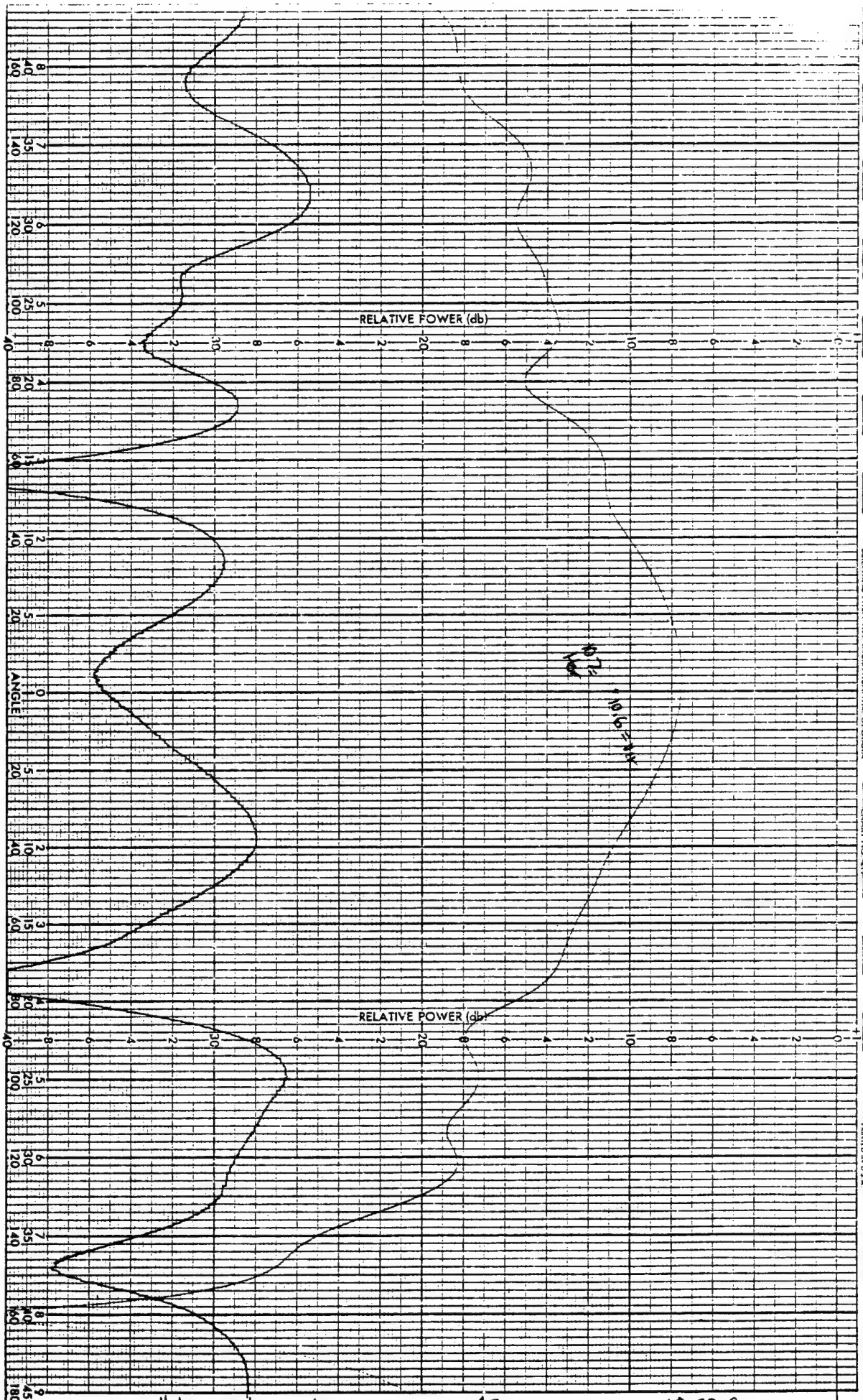
PROJECT

REMARKS Std Pattern .75 Horn Bl = Hor Red = Vert

ENGR

DATE 10-28-92

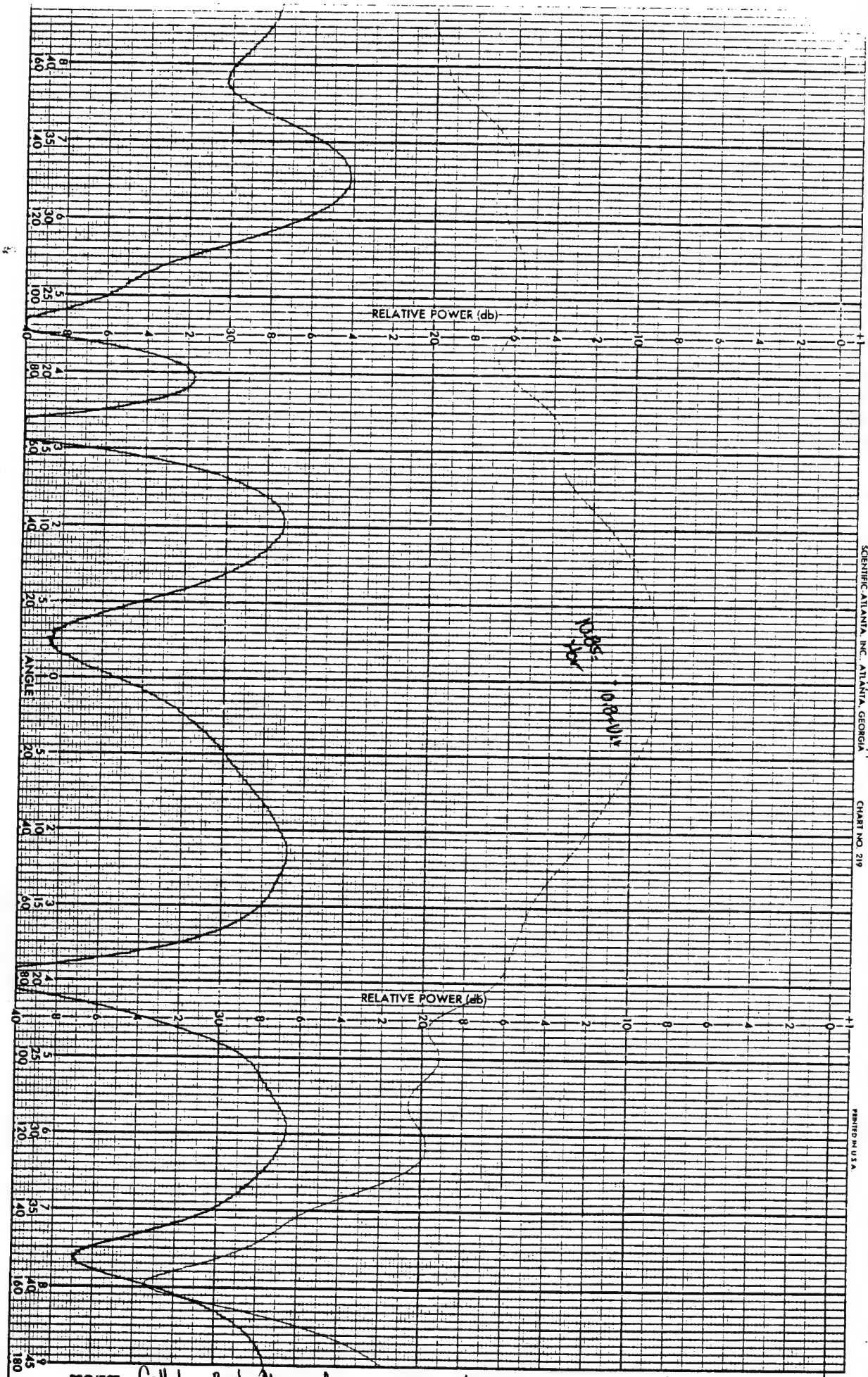
A-20 215518

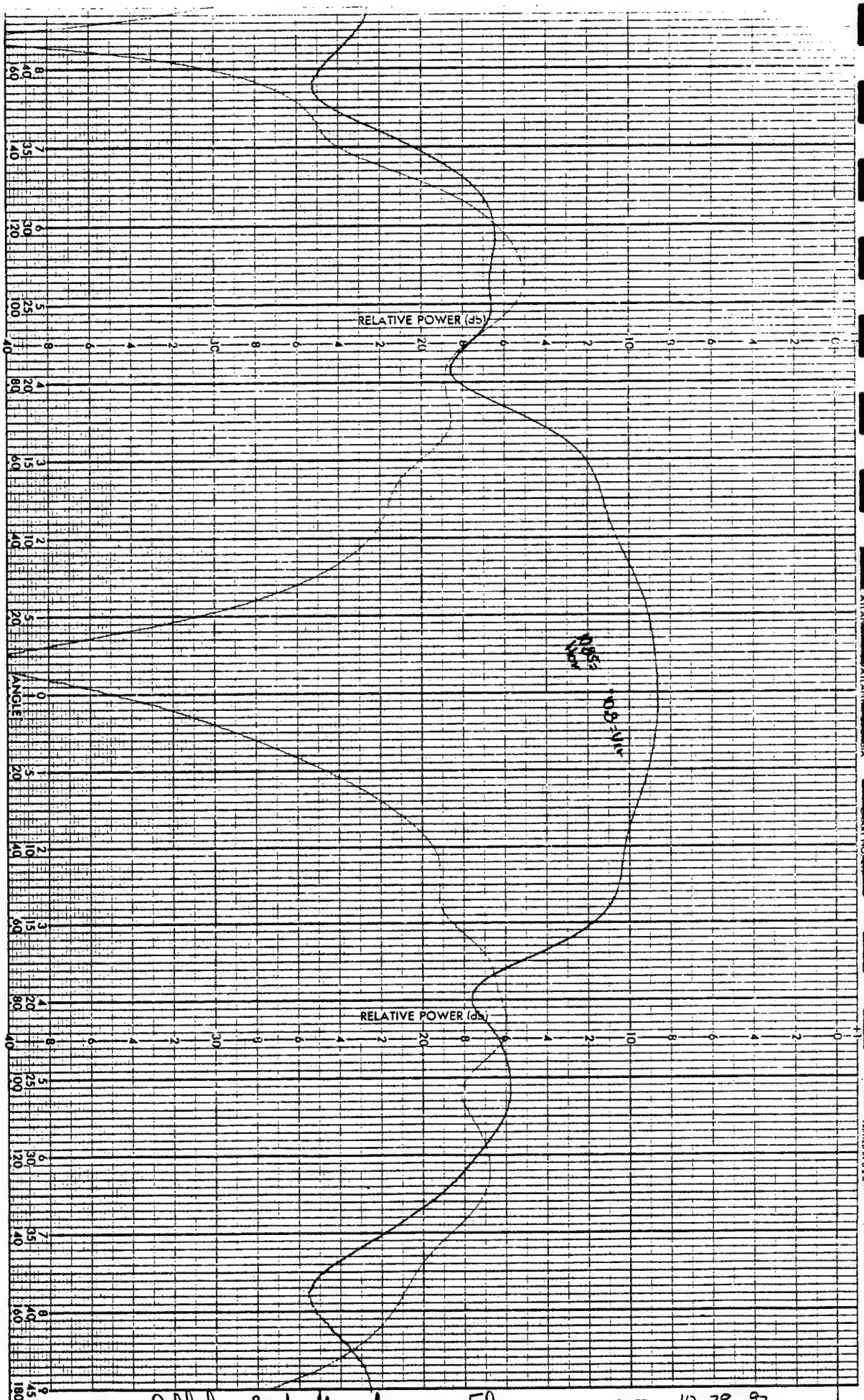


PROJECT Cellular bent mopole ENGR AZ DATE 10-28-92

REMARKS

960 MHz B1= Hor A=10 215520


RELATIVE POWER (db)
ANGLE
RELATIVE POWER (db)
SCIENTIFIC-ATLANTA, INC. ATLANTA, GEORGIA
CHART NO. 219
PRINTED IN U.S.A.
PROJECT Cellular Dual Monopole
REMARKS 890 MHz
ENGR AZ
DATE 10-28-92



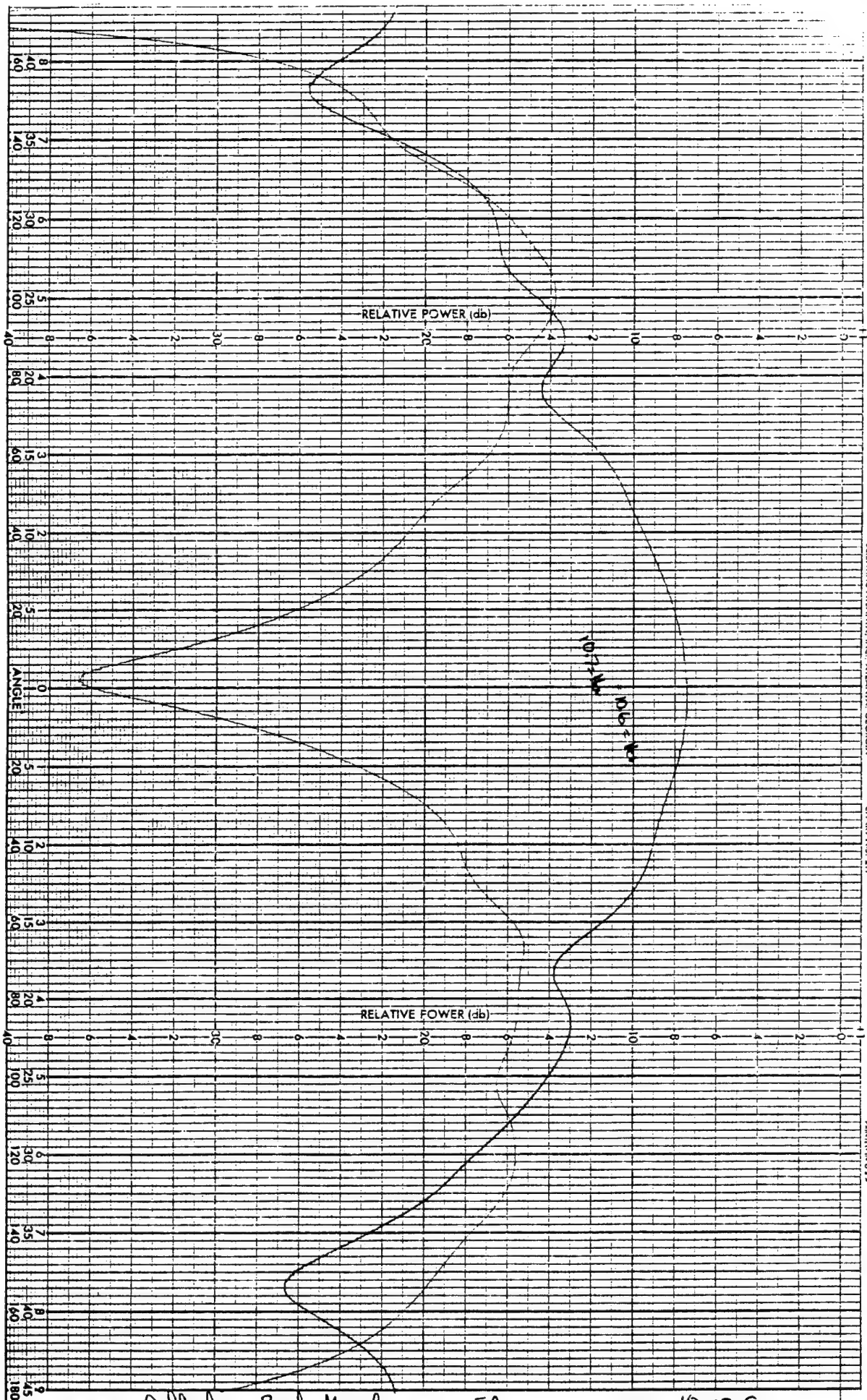
PROJECT Cellular Dent Monopole ENGR EL DATE 10-28-92

REMARKS

890 MHz

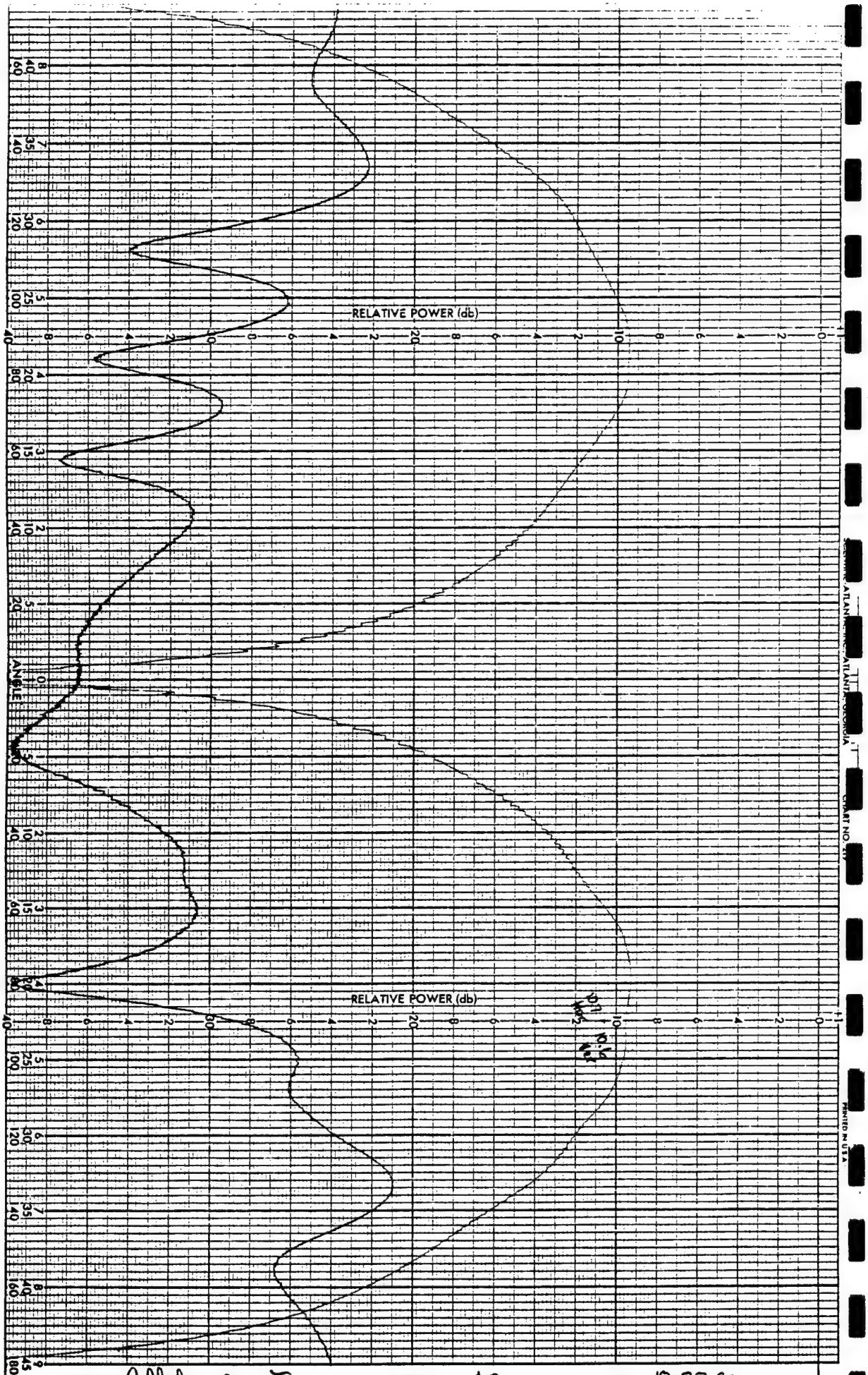
B1 = H

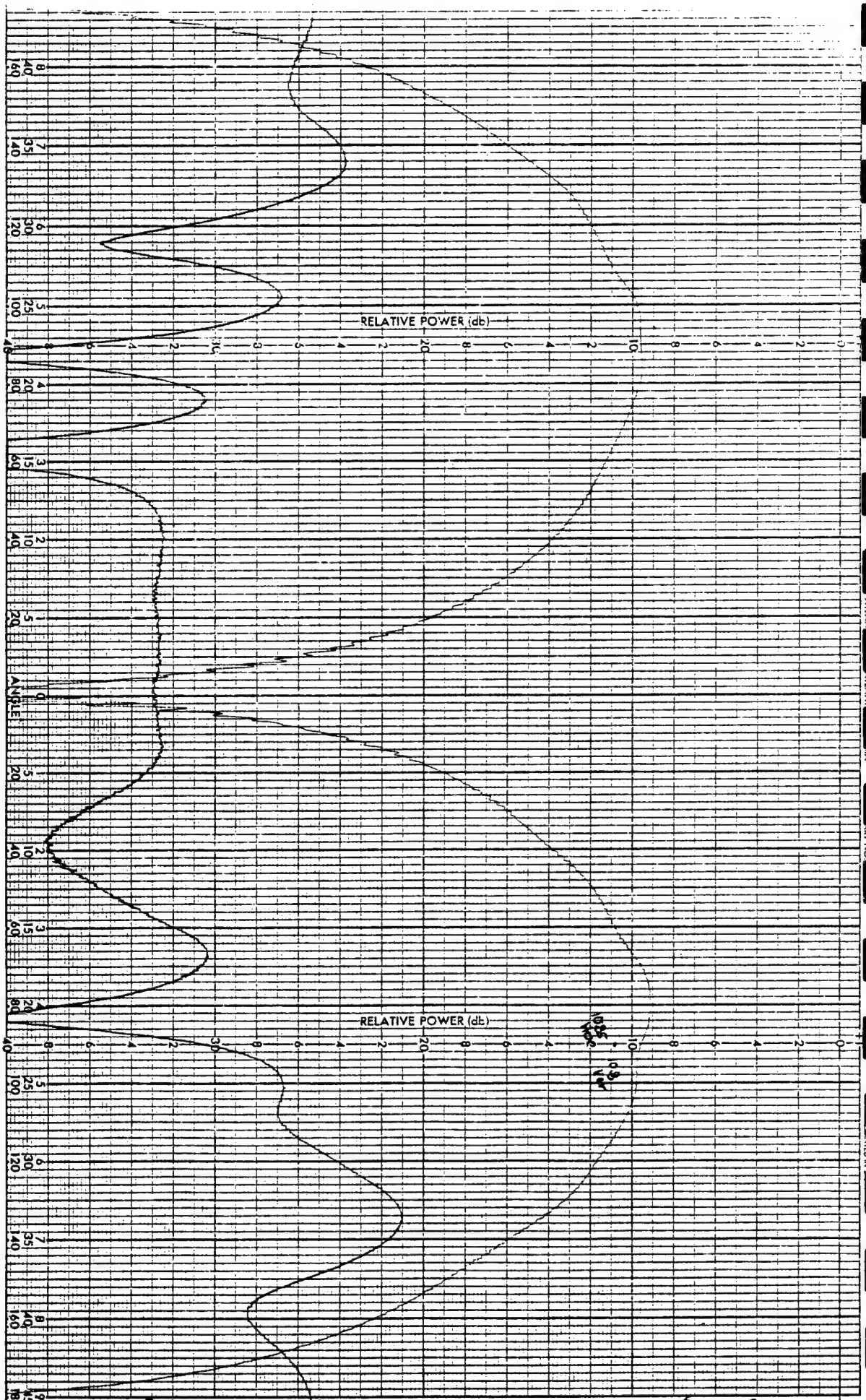
A-10 215523



PROJECT Cellular Bent Monopole ENGR EL DATE 10-28-91

REMARKS 860 MHz B1=Hm A=10 215524

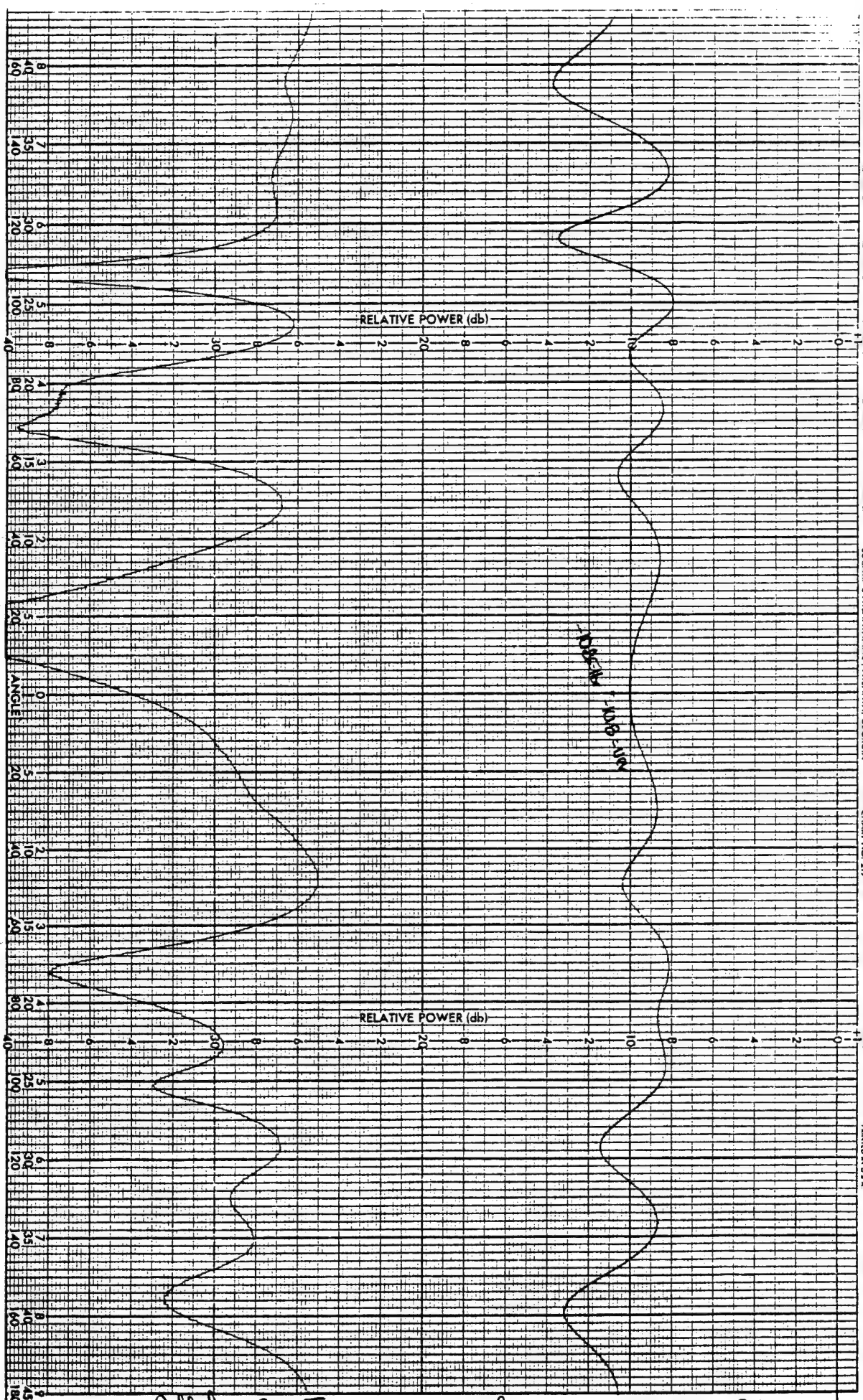

RELATIVE POWER (db)
ANGLE
RELATIVE POWER (db)
PROJECT Cellular Bow Tie
ENGR A2
DATE 10-28-92
REMARKS
860 MHz
B1=1K
A=10
215525

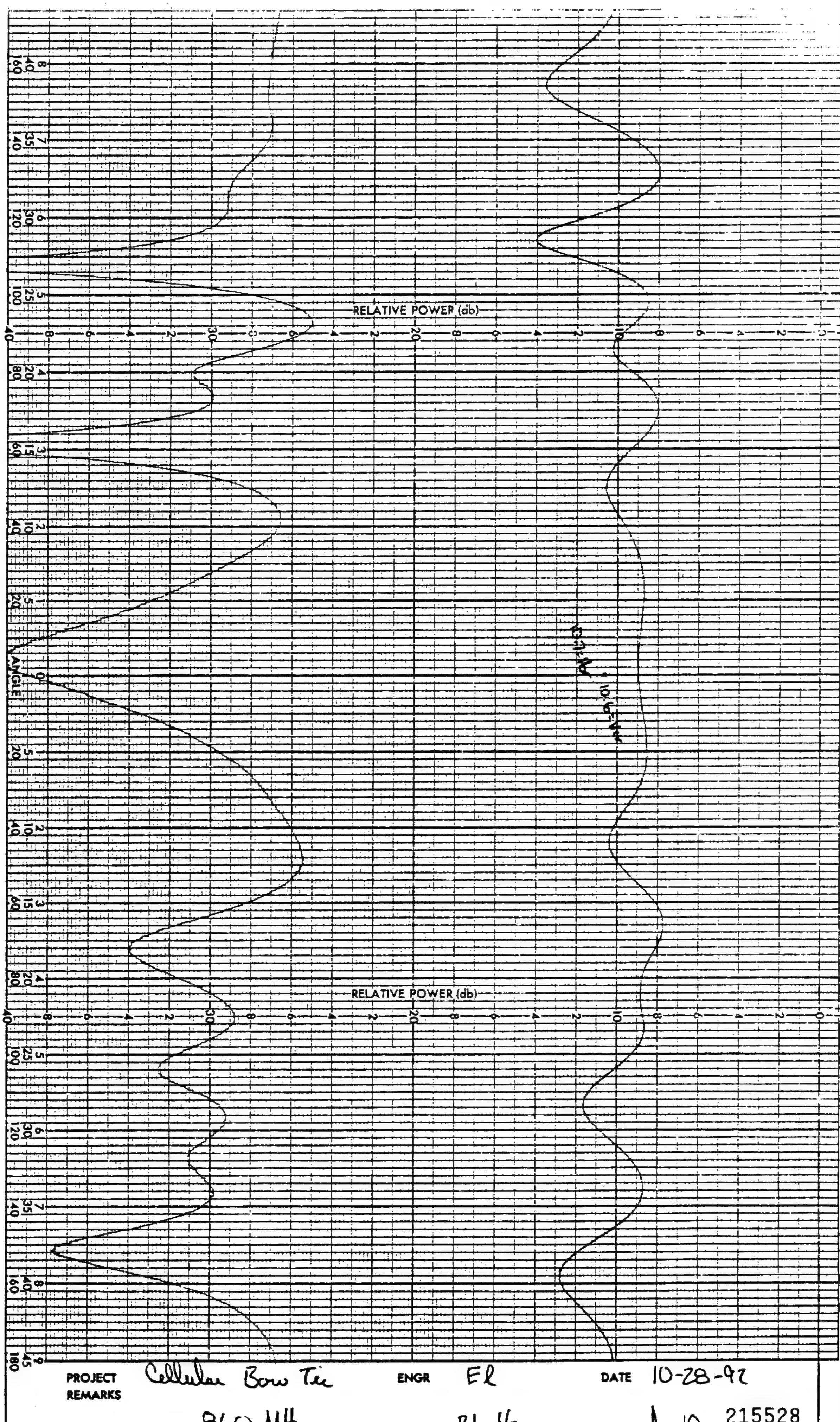


PROJECT Cellular Bow Tie ENGR AZ DATE 10-28-92

REMARKS 890 MHz

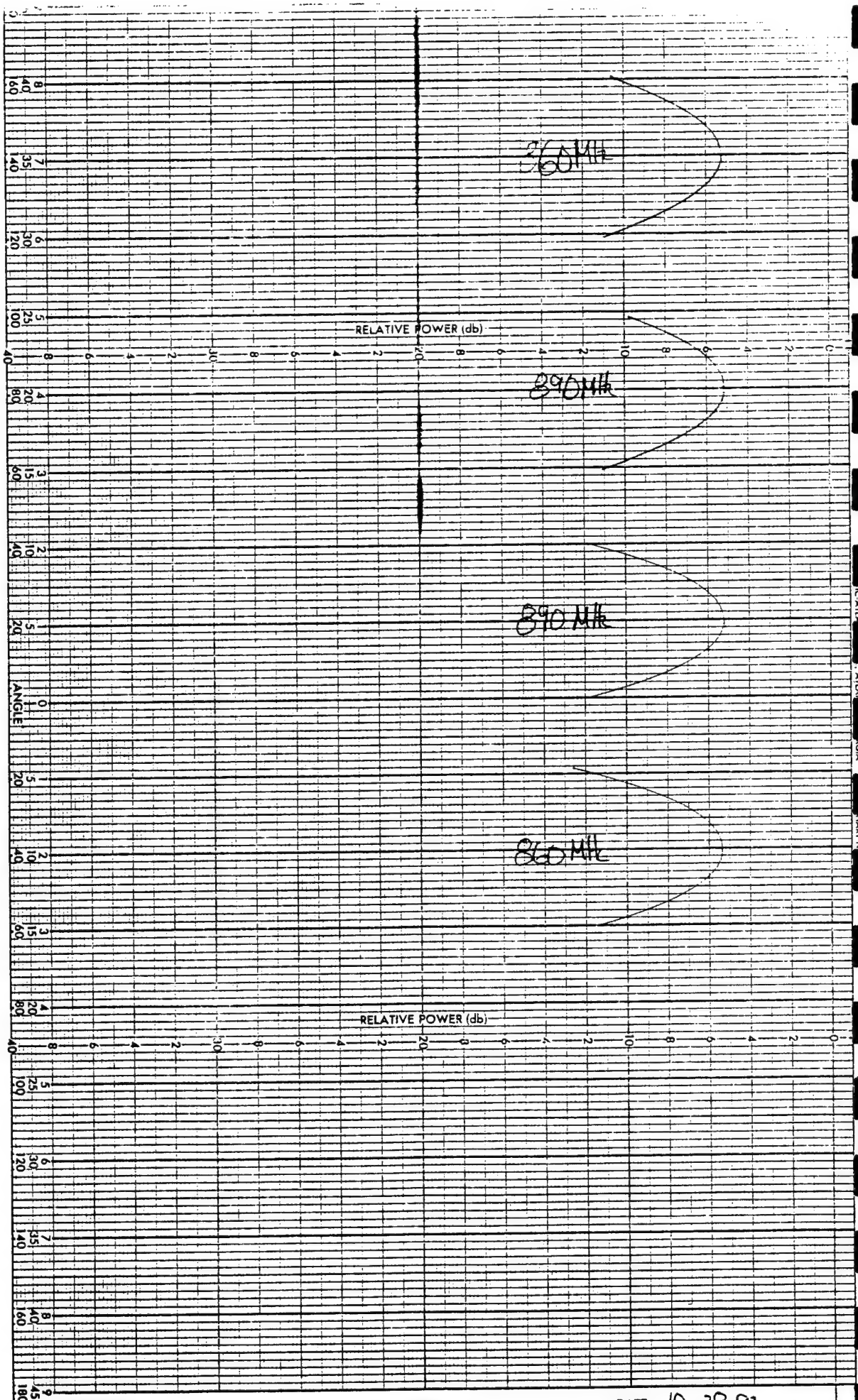
A-10 215526


RELATIVE POWER (db)
ANGLE
RELATIVE POWER (db)
-10dB = -10dB-UM
PROJECT Cellular Bow Tie
ENGR EL
DATE 10-28-92
REMARKS
890 MHz
B1 = Ho
A = 10
215527



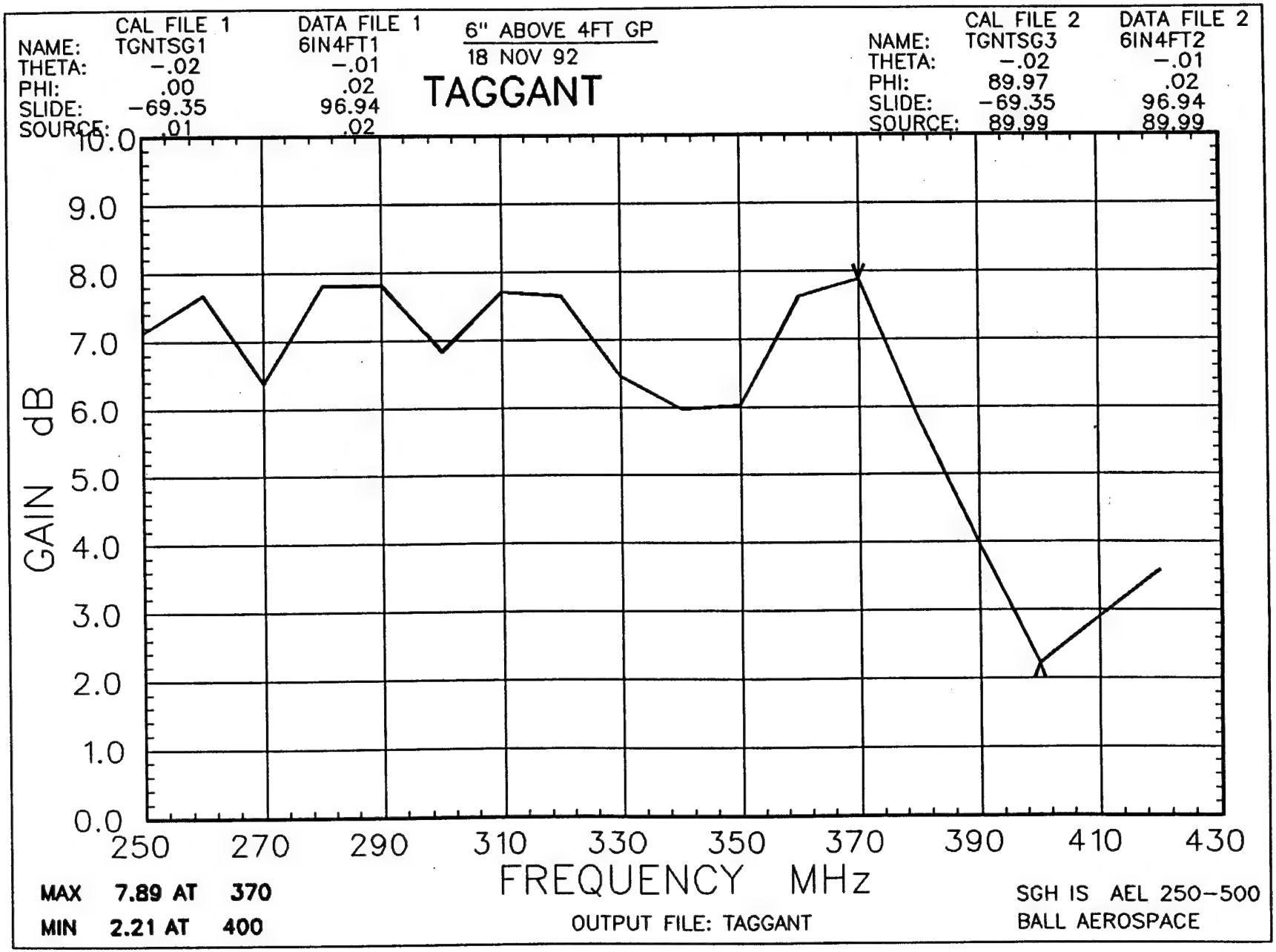
PROJECT Cellular Bow Tie ENGR El DATE 10-28-92

REMARKS 860 MHz B1=Hor A=10 215528


360MHz
890MHz
890 MHz
860 MHz
RELATIVE POWER (db)
RELATIVE POWER (db)
ANGLE
PROJECT
REMARKS
ENGR
DATE 10-28-92
215529

Appendix V

Antenna Below Variable Aperture


CAL FILE 1
NAME: TGNTSG1
THETA: -.02
PHI: .00
SLIDE: -69.35
SOURCE: .01
DATA FILE 1
6IN4FT1
-.01
.02
96.94
.02
6" ABOVE 4FT GP
18 NOV 92
TAGGANT
CAL FILE 2
NAME: TGNTSG3
THETA: -.02
PHI: 89.97
SLIDE: -69.35
SOURCE: 89.99
DATA FILE 2
6IN4FT2
-.01
.02
96.94
89.99
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250
270
290
310
330
350
370
390
410
430
FREQUENCY MHz
MAX 7.89 AT 370
MIN 2.21 AT 400
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

6" ABOVE 4FT GP 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE: -.02 PHI ANGLE: .00

SLIDE ANGLE: -69.35 SOURCE ANGLE: .01

CAL FILE #2 : TGNTSG3

THETA ANGLE: -.02 PHI ANGLE: 89.97

SLIDE ANGLE: -69.35 SOURCE ANGLE: 89.99

DATA FILE #1 :6IN4FT1

THETA ANGLE: -.01 PHI ANGLE: .02

SLIDE ANGLE: 96.94 SOURCE ANGLE: .02

DATA FILE #2 :6IN4FT2

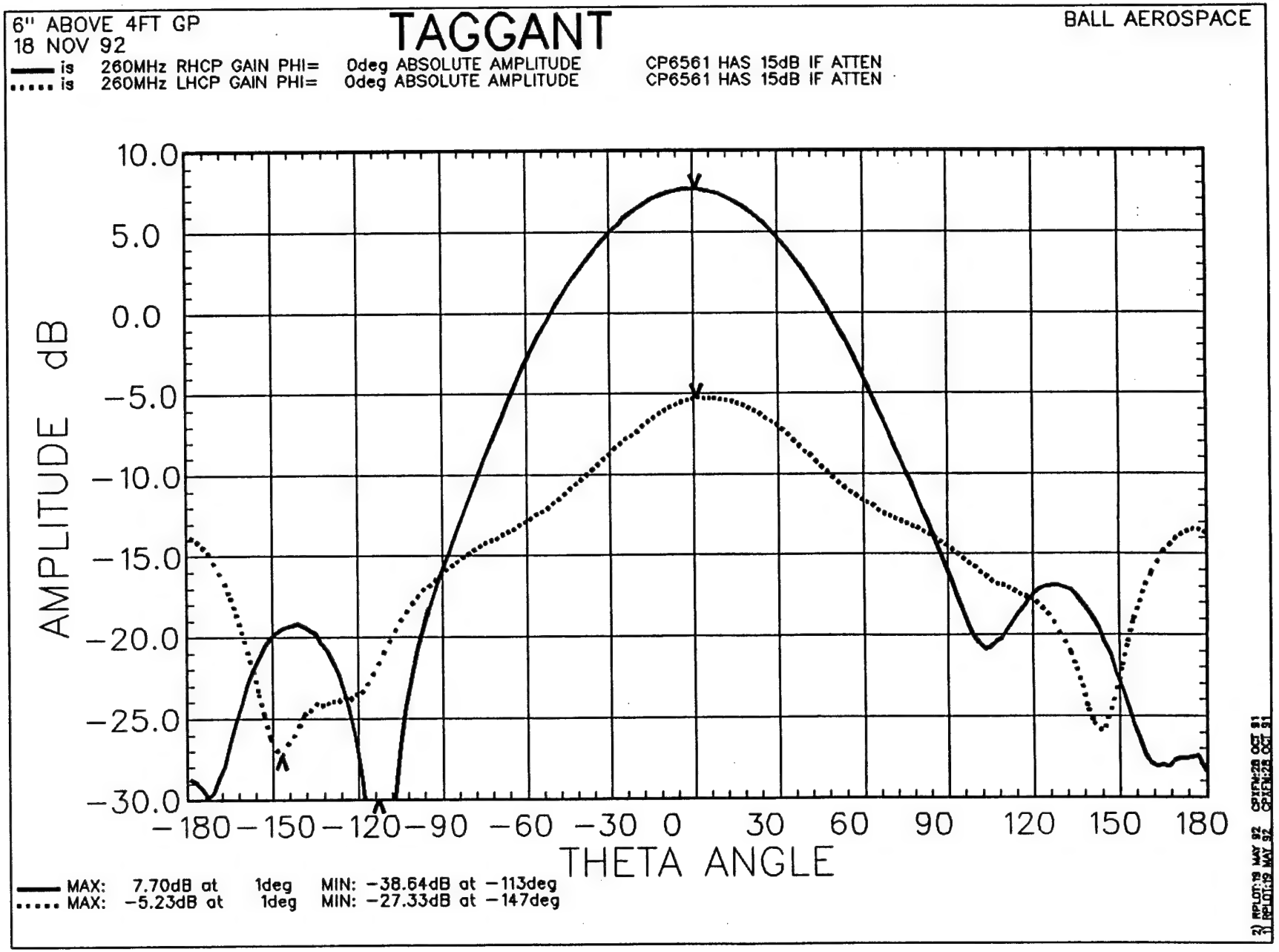
THETA ANGLE: -.01 PHI ANGLE: .02

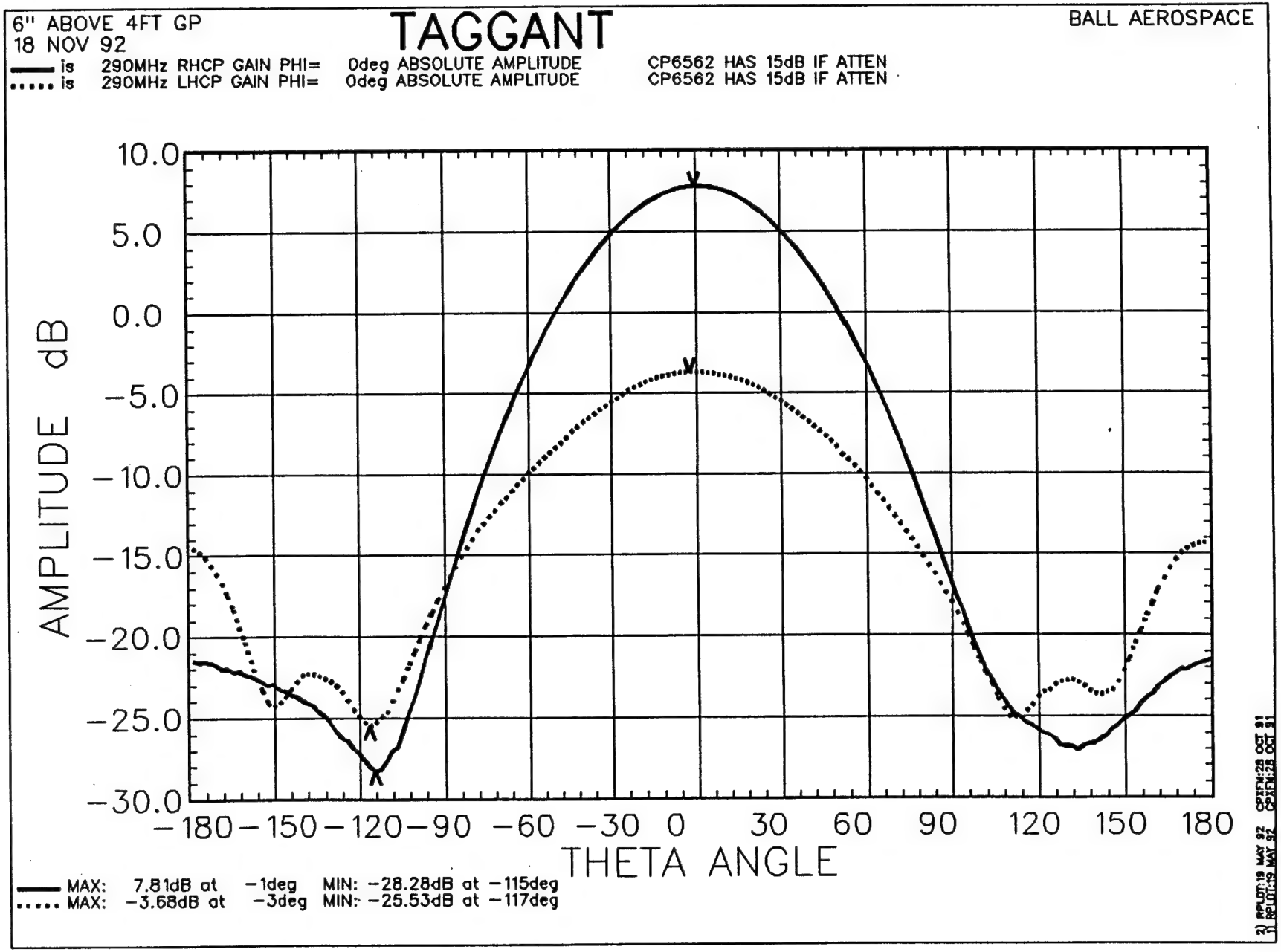
SLIDE ANGLE: 96.94 SOURCE ANGLE: 89.99

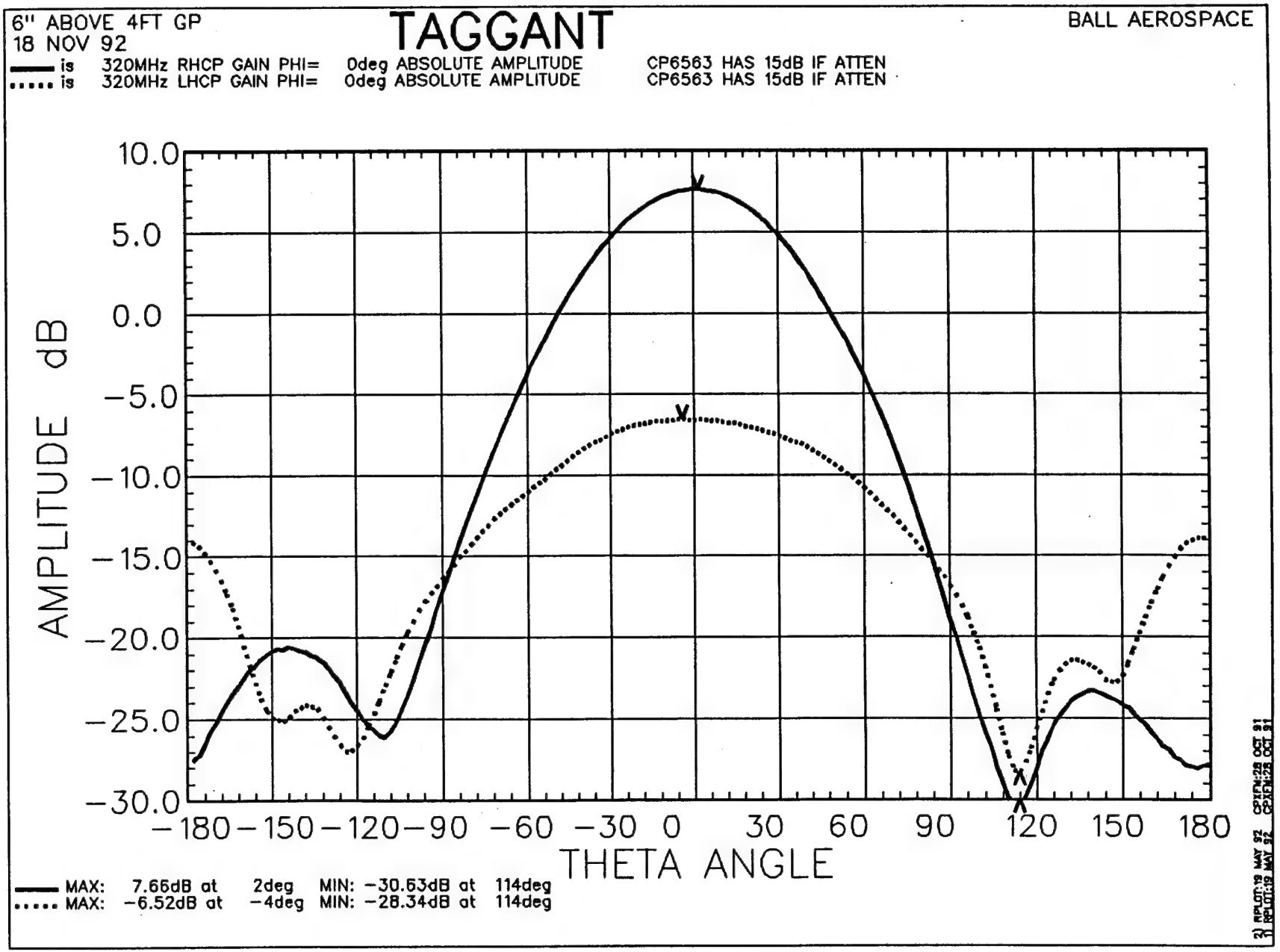
OUTPUT FILE: TAGGANT

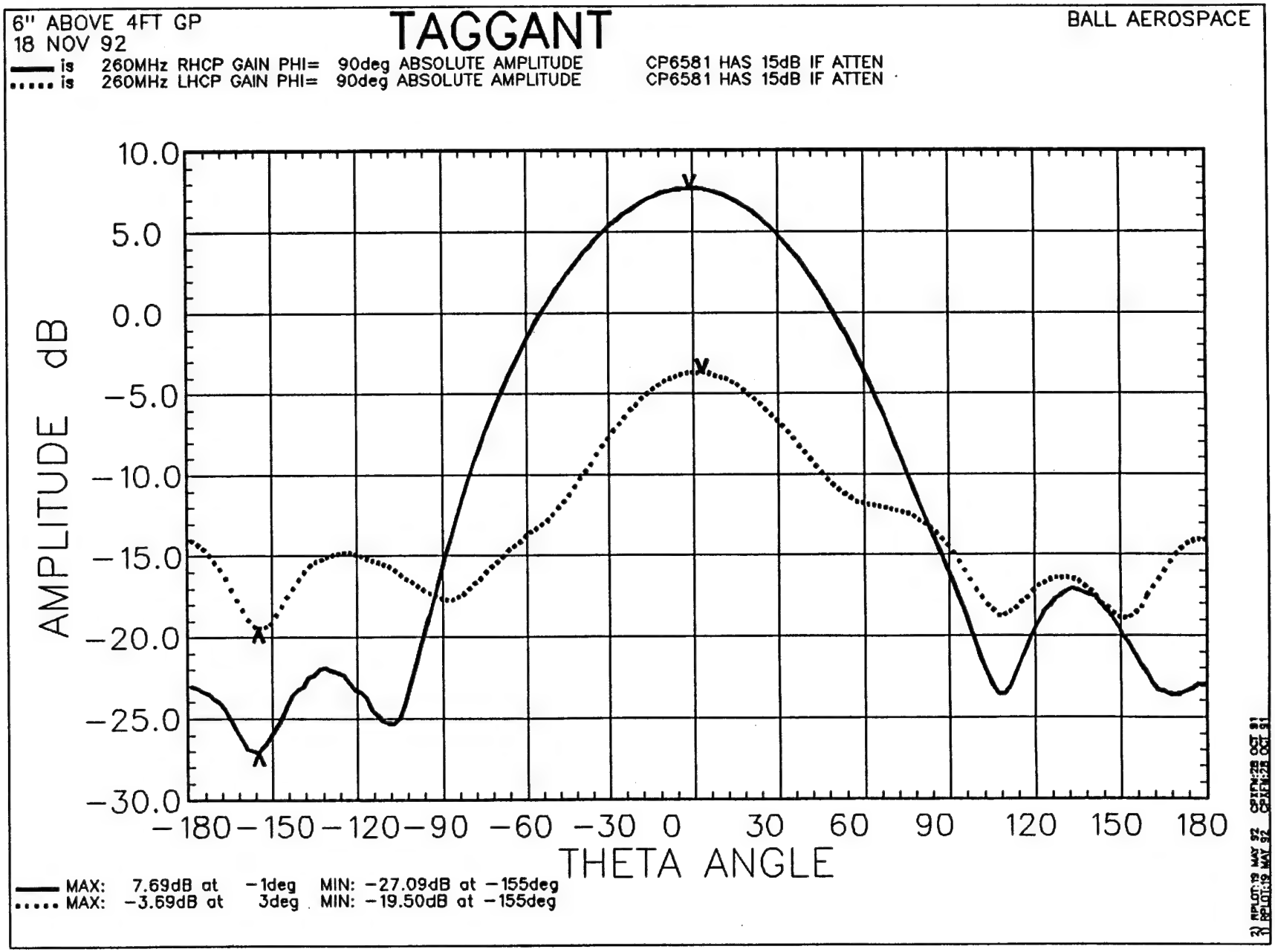
GAIN STANDARD: AEL 250-500

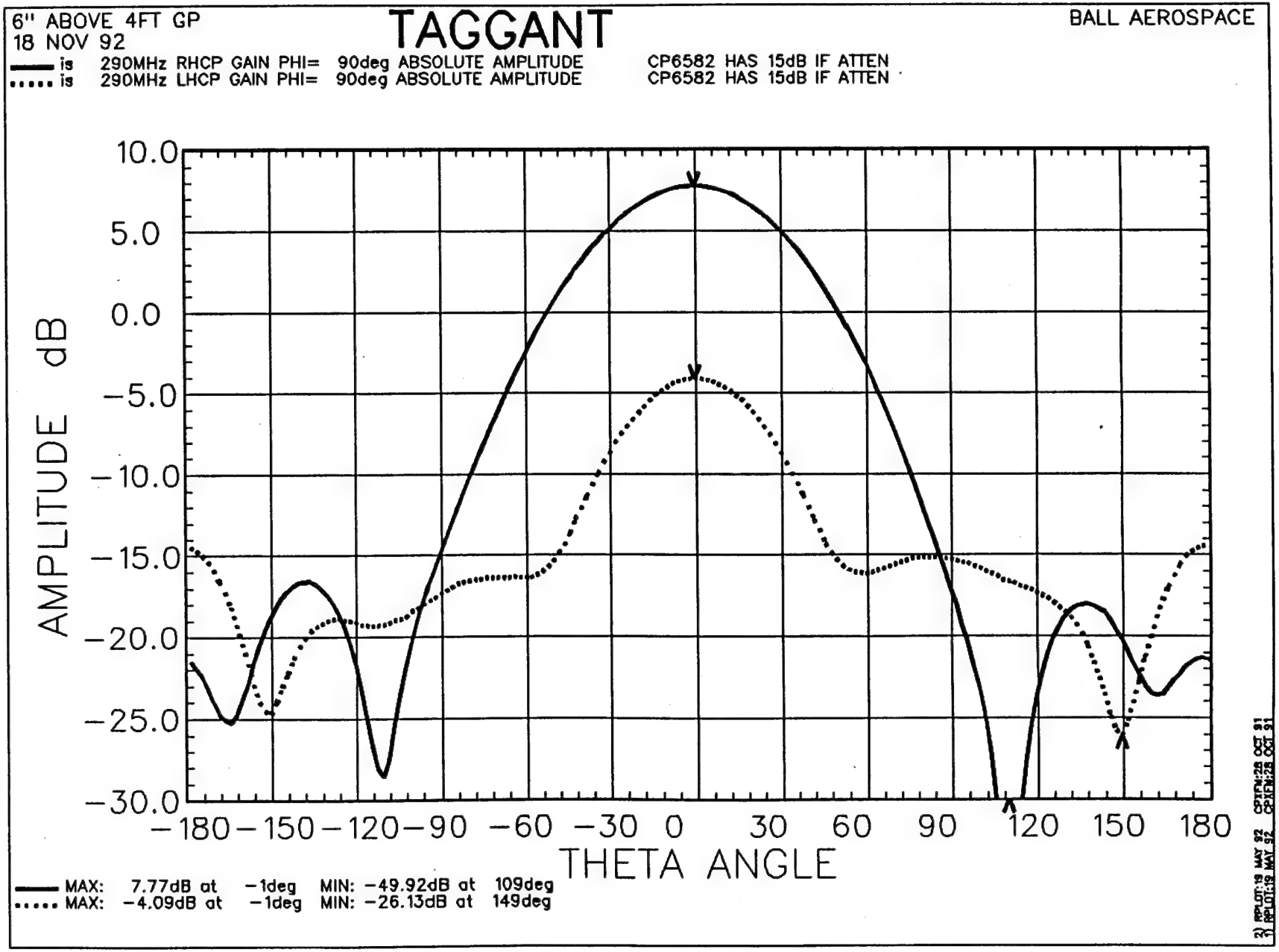
FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	7.13	-2.13	6.24	-44.63	11.30
260.	7.68	-5.38	3.93	63.90	11.57
270.	6.37	-.61	8.36	-23.73	11.84
280.	7.82	-10.06	2.23	33.30	12.11
290.	7.81	-3.66	4.75	-64.12	12.38
300.	6.84	-1.97	6.60	-20.17	12.65
310.	7.71	-8.86	2.60	5.82	12.89
320.	7.65	-6.62	3.40	-82.94	13.13
330.	6.47	-2.38	6.57	-44.07	13.37
340.	5.98	-4.33	5.48	-50.21	13.61
350.	6.02	-15.78	1.42	12.99	13.85
360.	7.63	-7.04	3.25	-88.17	14.02
370.	7.89	-4.24	4.39	-72.42	14.19
380.	5.84	-6.10	4.49	-44.93	14.36
390.	3.99	-9.61	3.69	-37.53	14.53
400.	2.21	-13.22	2.97	-13.53	14.70
410.	2.90	-11.29	3.44	-70.56	14.91
420.	3.58	-7.89	4.75	-78.45	15.12

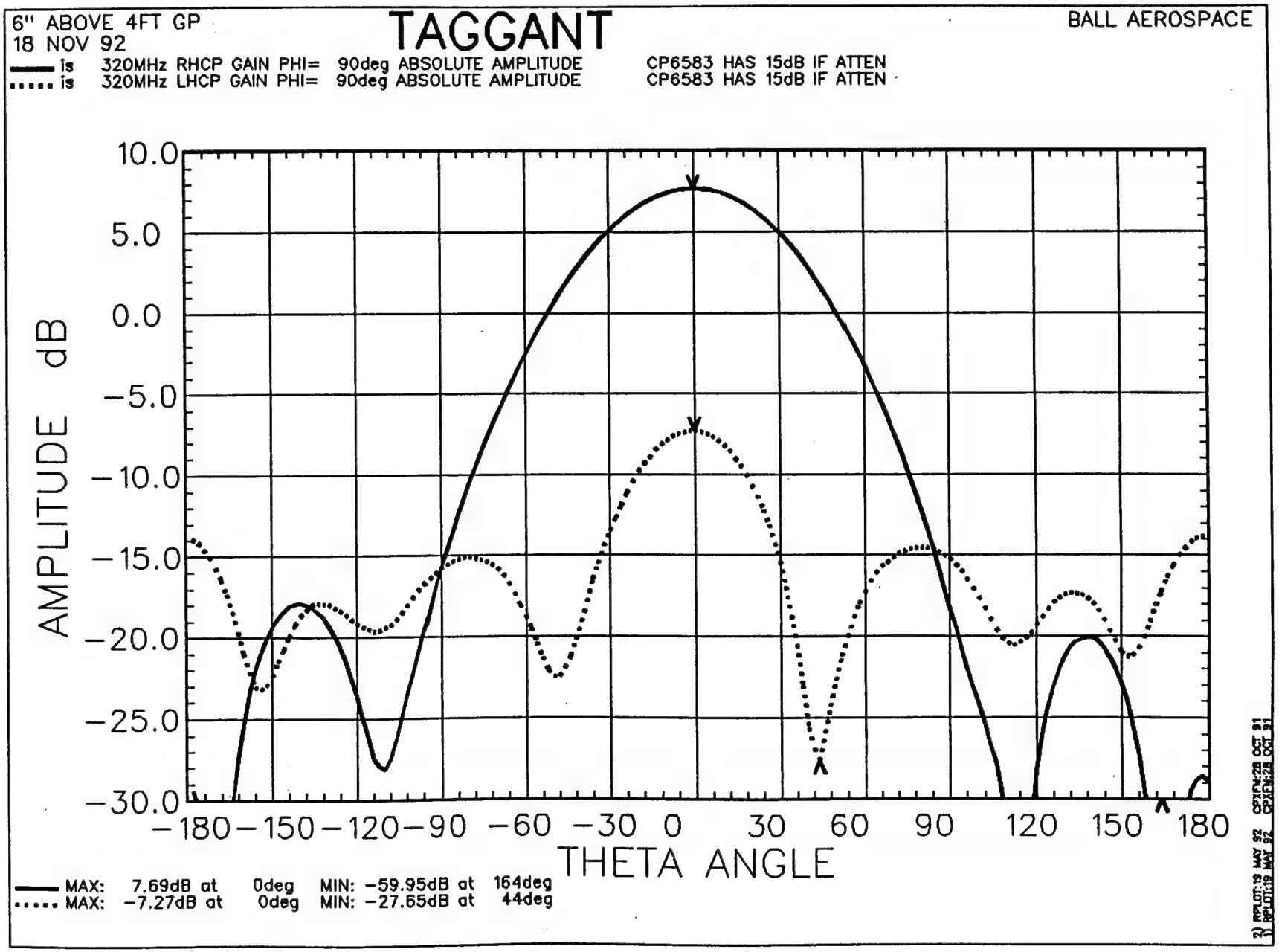

6" ABOVE 4FT GP
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6561 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6561 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
−5.0
−10.0
−15.0
−20.0
−25.0
−30.0
−180 −150 −120 −90 −60 −30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.70dB at 1deg MIN: −38.64dB at −113deg
MAX: −5.23dB at 1deg MIN: −27.33dB at −147deg

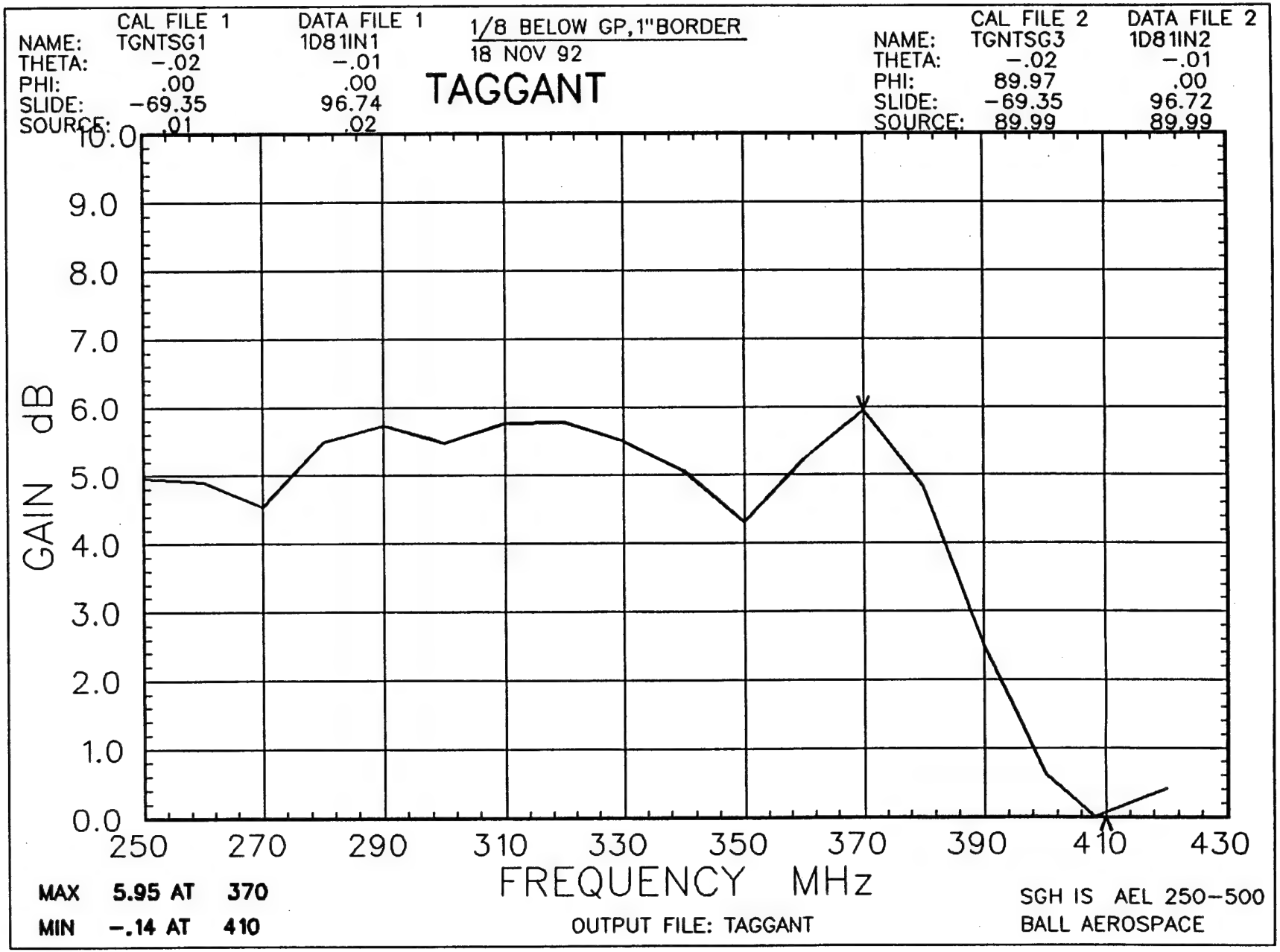

6" ABOVE 4FT GP
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE
is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE
CP6562 HAS 15dB IF ATTEN
CP6562 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
−5.0
−10.0
−15.0
−20.0
−25.0
−30.0
−180 −150 −120 −90 −60 −30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.81dB at −1deg MIN: −28.28dB at −115deg
MAX: −3.68dB at −3deg MIN: −25.53dB at −117deg
2) RPLOT:19 MAY 92 CPTEM:28 OCT 91
1) RPLOT:19 MAY 92 CPTEM:28 OCT 91


6" ABOVE 4FT GP
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6563 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6563 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.66dB at 2deg MIN: -30.63dB at 114deg
MAX: -6.52dB at -4deg MIN: -28.34dB at 114deg


6" ABOVE 4FT GP
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6581 HAS 15dB IF ATTEN
CP6581 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.69dB at -1deg MIN: -27.09dB at -155deg
MAX: -3.69dB at 3deg MIN: -19.50dB at -155deg


6" ABOVE 4FT GP
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6582 HAS 15dB IF ATTEN
is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6582 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.77dB at -1deg MIN: -49.92dB at 109deg
MAX: -4.09dB at -1deg MIN: -26.13dB at 149deg
2) RPLOT:19 MAY 92 CP1FR:28 OCT 91
1) RPLOT:19 MAY 92 CP1FR:28 OCT 91


6" ABOVE 4FT GP
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6583 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6583 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.69dB at 0deg MIN: -59.95dB at 164deg
MAX: -7.27dB at 0deg MIN: -27.65dB at 44deg
2) RPLOT:19 MAY 92 CPLOT:28 OCT 91
1) RPLOT:19 MAY 92 CPLOT:28 OCT 91


CAL FILE 1
DATA FILE 1
1/8 BELOW GP,1"BORDER
18 NOV 92
TAGGANT
CAL FILE 2
DATA FILE 2
NAME: TGNTSG1 1D81IN1
THETA: -.02 -.01
PHI: .00 .00
SLIDE: -69.35 96.74
SOURCE: .01 .02
NAME: TGNTSG3 1D81IN2
THETA: -.02 -.01
PHI: 89.97 .00
SLIDE: -69.35 96.72
SOURCE: 89.99 89.99
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250 270 290 310 330 350 370 390 410 430
FREQUENCY MHz
MAX 5.95 AT 370
MIN -.14 AT 410
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

1/8 BELOW GP,1"BORDER 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE: -.02 PHI ANGLE: .00

SLIDE ANGLE: -69.35 SOURCE ANGLE: .01

CAL FILE #2 : TGNTSG3

THETA ANGLE: -.02 PHI ANGLE: 89.97

SLIDE ANGLE: -69.35 SOURCE ANGLE: 89.99

DATA FILE #1 :1D81IN1

THETA ANGLE: -.01 PHI ANGLE: .00

SLIDE ANGLE: 96.74 SOURCE ANGLE: .02

DATA FILE #2 :1D81IN2

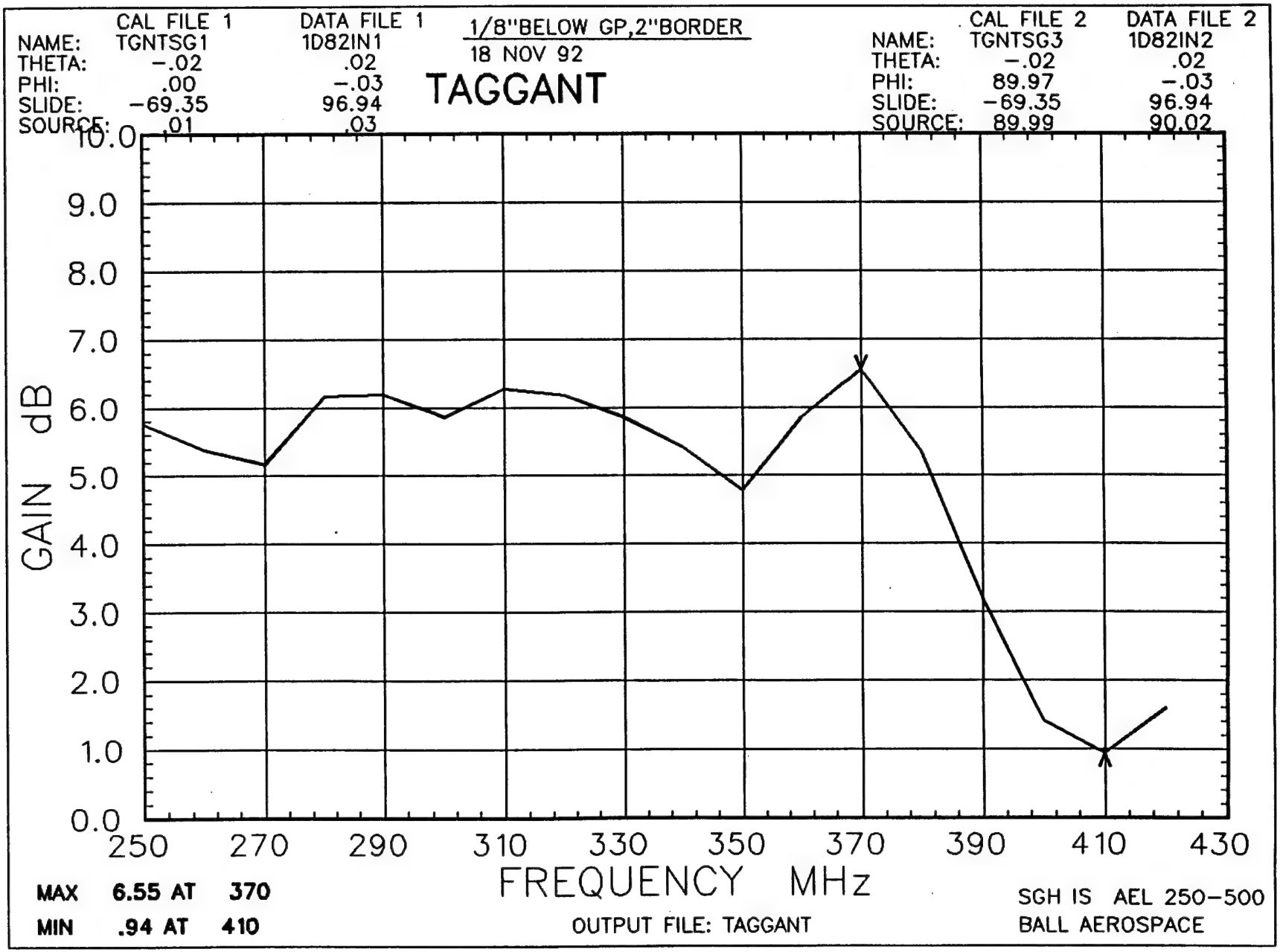
THETA ANGLE: -.01 PHI ANGLE: .00

SLIDE ANGLE: 96.72 SOURCE ANGLE: 89.99

OUTPUT FILE: TAGGANT

GAIN STANDARD: AEL 250-500

FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	4.96	-2.07	8.32	-75.57	11.30
260.	4.91	-.85	9.91	42.05	11.57
270.	4.54	-3.34	7.44	-47.00	11.84
280.	5.49	-4.81	5.48	19.87	12.11
290.	5.73	-5.08	5.15	86.40	12.38
300.	5.47	-6.66	4.39	-34.53	12.65
310.	5.76	-6.59	4.27	10.94	12.89
320.	5.78	-6.49	4.32	68.59	13.13
330.	5.50	-8.15	3.67	-72.20	13.37
340.	5.06	-12.01	2.45	-77.27	13.61
350.	4.31	-9.00	3.82	28.21	13.85
360.	5.23	-8.12	3.80	50.47	14.02
370.	5.95	-10.50	2.63	59.40	14.19
380.	4.84	-30.90	.28	4.61	14.36
390.	2.51	-18.57	1.54	-2.81	14.53
400.	.62	-14.54	3.06	10.87	14.70
410.	-.14	-17.70	2.31	35.47	14.91
420.	.41	-15.29	2.88	37.92	15.12


CAL FILE 1
DATA FILE 1
1/8"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
CAL FILE 2
DATA FILE 2
NAME: TGNTSG1 1D82IN1
THETA: -.02 .02
PHI: .00 -.03
SLIDE: -69.35 96.94
SOURCE: .01 .03
NAME: TGNTSG3 1D82IN2
THETA: -.02 .02
PHI: 89.97 -.03
SLIDE: -69.35 96.94
SOURCE: 89.99 90.02
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250 270 290 310 330 350 370 390 410 430
FREQUENCY MHz
MAX 6.55 AT 370
MIN .94 AT 410
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

1/8"BELOW GP,2"BORDER 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE: -.02 PHI ANGLE: .00

SLIDE ANGLE: -69.35 SOURCE ANGLE: .01

CAL FILE #2 : TGNTSG3

THETA ANGLE: -.02 PHI ANGLE: 89.97

SLIDE ANGLE: -69.35 SOURCE ANGLE: 89.99

DATA FILE #1 :1D82IN1

THETA ANGLE: .02 PHI ANGLE: -.03

SLIDE ANGLE: 96.94 SOURCE ANGLE: .03

DATA FILE #2 :1D82IN2

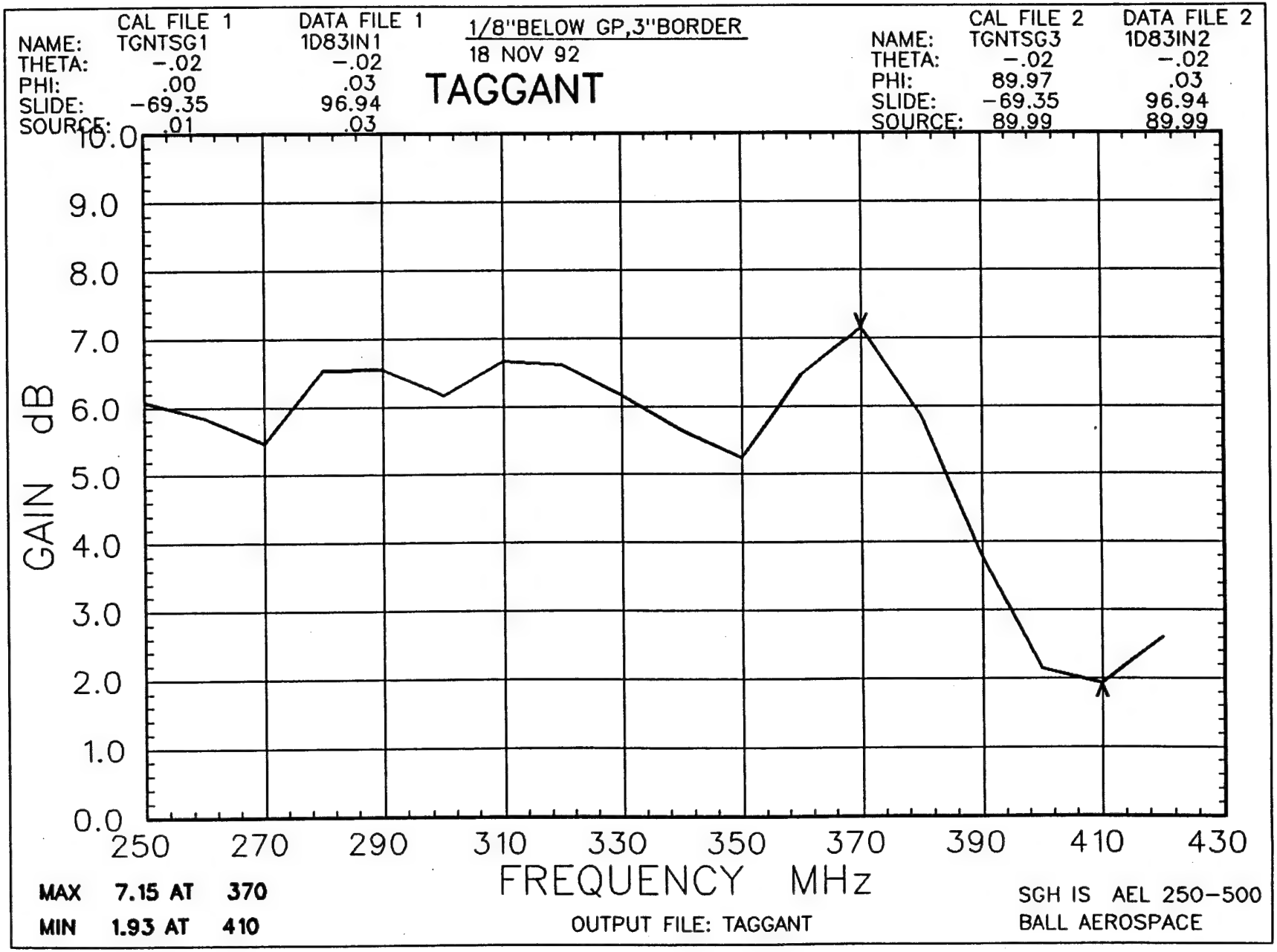
THETA ANGLE: .02 PHI ANGLE: -.03

SLIDE ANGLE: 96.94 SOURCE ANGLE: 90.02

OUTPUT FILE: TAGGANT

GAIN STANDARD: AEL 250-500

FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	5.75	-3.99	5.88	88.21	11.30
260.	5.38	-.95	9.14	35.68	11.57
270.	5.17	-3.80	6.47	-42.60	11.84
280.	6.17	-6.55	4.09	21.00	12.11
290.	6.19	-6.32	4.19	81.02	12.38
300.	5.86	-6.67	4.18	-29.00	12.65
310.	6.27	-8.05	3.38	11.27	12.89
320.	6.18	-7.08	3.84	66.93	13.13
330.	5.86	-9.08	3.14	-66.80	13.37
340.	5.41	-12.51	2.22	-77.99	13.61
350.	4.78	-9.13	3.55	28.70	13.85
360.	5.86	-9.58	2.96	53.53	14.02
370.	6.55	-11.83	2.10	60.68	14.19
380.	5.35	-20.28	.91	-16.65	14.36
390.	3.20	-17.89	1.54	-5.37	14.53
400.	1.40	-13.49	3.16	9.35	14.70
410.	.94	-20.56	1.47	36.39	14.91
420.	1.59	-17.39	1.96	40.98	15.12


CAL FILE 1
DATA FILE 1
1/8"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
CAL FILE 2
DATA FILE 2
NAME: TGNTSG1 1D83IN1
THETA: -.02 -.02
PHI: .00 .03
SLIDE: -69.35 96.94
SOURCE: .01 .03
NAME: TGNTSG3 1D83IN2
THETA: -.02 -.02
PHI: 89.97 .03
SLIDE: -69.35 96.94
SOURCE: 89.99 89.99
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250 270 290 310 330 350 370 390 410 430
FREQUENCY MHz
MAX 7.15 AT 370
MIN 1.93 AT 410
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

1/8"BELOW GP,3"BORDER 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE: -.02 PHI ANGLE: .00

SLIDE ANGLE: -69.35 SOURCE ANGLE: .01

CAL FILE #2 : TGNTSG3

THETA ANGLE: -.02 PHI ANGLE: 89.97

SLIDE ANGLE: -69.35 SOURCE ANGLE: 89.99

DATA FILE #1 :1D83IN1

THETA ANGLE: -.02 PHI ANGLE: .03

SLIDE ANGLE: 96.94 SOURCE ANGLE: .03

DATA FILE #2 :1D83IN2

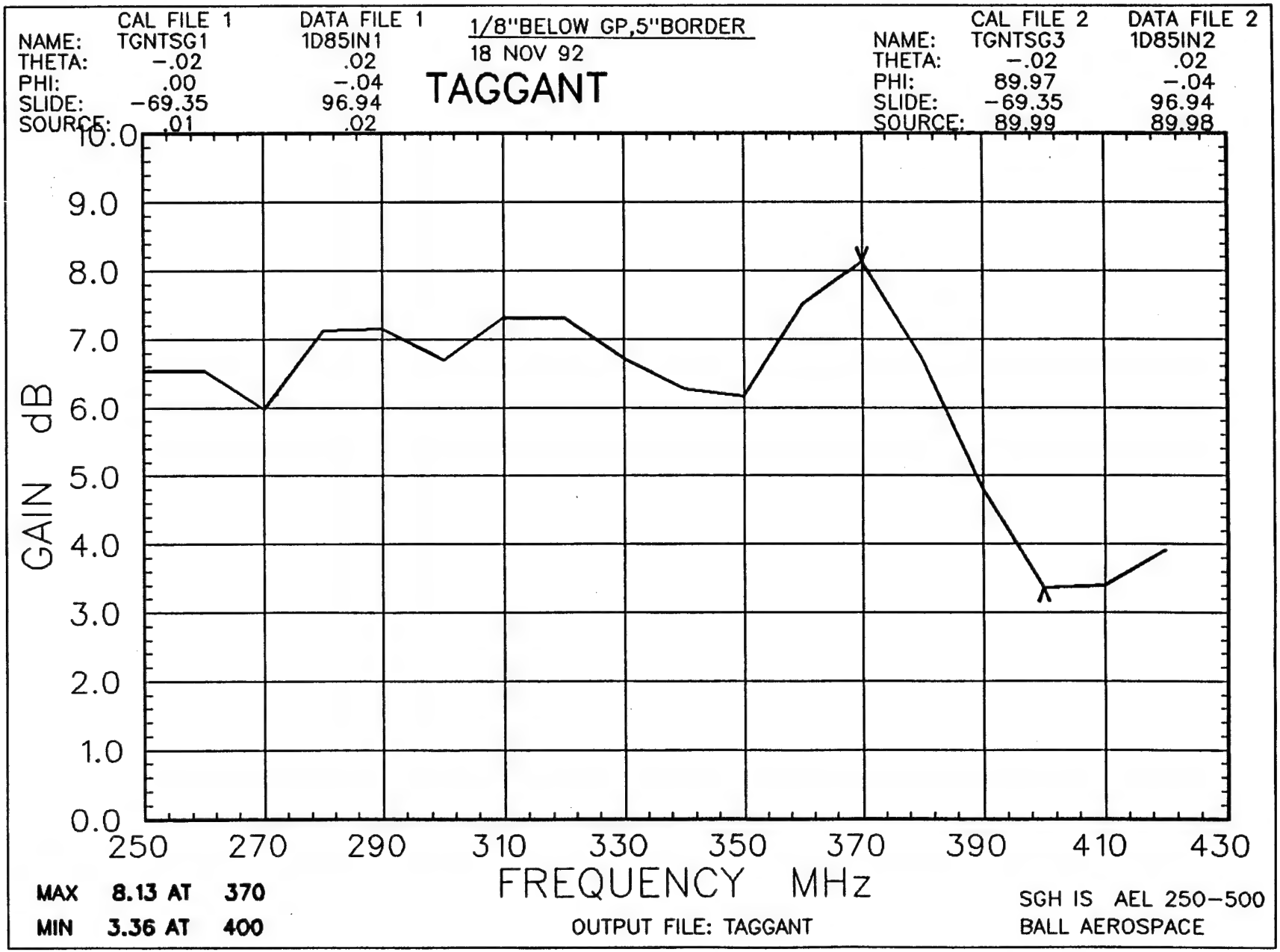
THETA ANGLE: -.02 PHI ANGLE: .03

SLIDE ANGLE: 96.94 SOURCE ANGLE: 89.99

OUTPUT FILE: TAGGANT

GAIN STANDARD: AEL 250-500

FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	6.08	-6.40	4.21	-89.21	11.30
260.	5.84	-1.83	7.64	34.82	11.57
270.	5.47	-3.83	6.21	-38.37	11.84
280.	6.54	-8.14	3.24	20.20	12.11
290.	6.55	-7.47	3.51	85.52	12.38
300.	6.17	-6.23	4.25	-25.51	12.65
310.	6.67	-8.76	2.97	11.41	12.89
320.	6.61	-8.25	3.18	70.02	13.13
330.	6.17	-8.91	3.09	-59.36	13.37
340.	5.64	-12.94	2.05	-69.77	13.61
350.	5.24	-9.74	3.13	29.74	13.85
360.	6.47	-11.14	2.30	60.28	14.02
370.	7.15	-14.13	1.50	69.53	14.19
380.	5.85	-15.44	1.50	-22.92	14.36
390.	3.78	-16.15	1.76	-10.83	14.53
400.	2.14	-13.19	3.00	7.92	14.70
410.	1.93	-26.18	.68	46.26	14.91
420.	2.60	-19.99	1.29	52.46	15.12


CAL FILE 1
DATA FILE 1
1/8"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
CAL FILE 2
DATA FILE 2
NAME: TGNTSG1 1D85IN1
THETA: -.02 .02
PHI: .00 -.04
SLIDE: -69.35 96.94
SOURCE: .01 .02
NAME: TGNTSG3 1D85IN2
THETA: -.02 .02
PHI: 89.97 -.04
SLIDE: -69.35 96.94
SOURCE: 89.99 89.98
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250 270 290 310 330 350 370 390 410 430
FREQUENCY MHz
MAX 8.13 AT 370
MIN 3.36 AT 400
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

1/8"BELOW GP,5"BORDER 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE:	-.02	PHI ANGLE:	.00
SLIDE ANGLE:	-69.35	SOURCE ANGLE:	.01

CAL FILE #2 : TGNTSG3

THETA ANGLE:	-.02	PHI ANGLE:	89.97
SLIDE ANGLE:	-69.35	SOURCE ANGLE:	89.99

DATA FILE #1 :1D85IN1

THETA ANGLE:	.02	PHI ANGLE:	-.04
SLIDE ANGLE:	96.94	SOURCE ANGLE:	.02

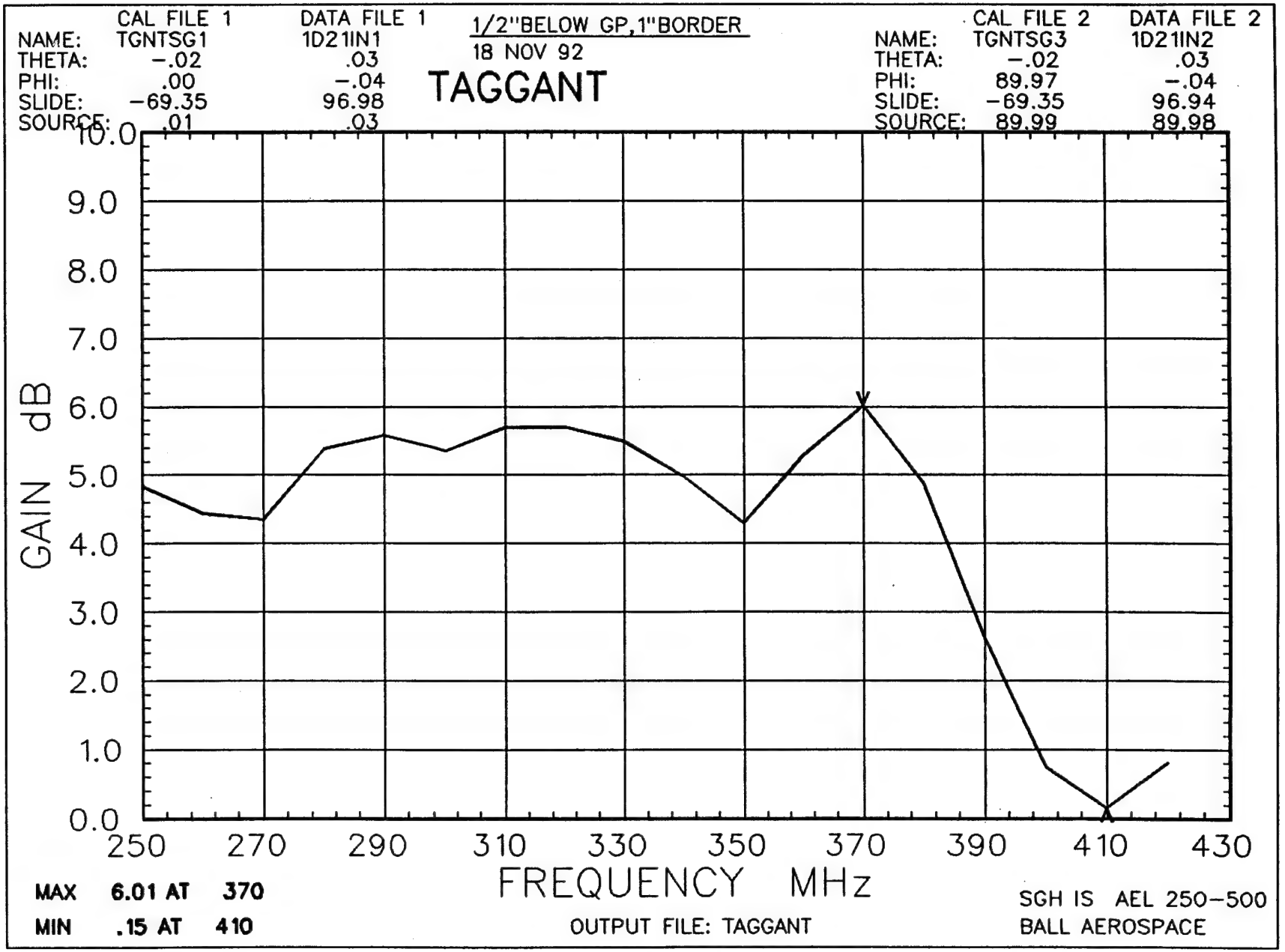
DATA FILE #2 :1D85IN2

THETA ANGLE:	.02	PHI ANGLE:	-.04
SLIDE ANGLE:	96.94	SOURCE ANGLE:	89.98

OUTPUT FILE: TAGGANT

GAIN STANDARD: AEL 250-500

FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	6.54	-8.59	3.07	-78.71	11.30
260.	6.54	-3.82	5.44	34.39	11.57
270.	5.98	-3.27	6.25	-35.76	11.84
280.	7.13	-12.31	1.86	18.20	12.11
290.	7.15	-8.14	3.02	-84.60	12.38
300.	6.70	-5.09	4.58	-24.34	12.65
310.	7.32	-11.01	2.12	7.61	12.89
320.	7.31	-9.00	2.68	80.37	13.13
330.	6.72	-6.80	3.72	-52.91	13.37
340.	6.27	-10.14	2.65	-62.27	13.61
350.	6.17	-11.68	2.24	32.06	13.85
360.	7.51	-11.19	2.03	78.16	14.02
370.	8.13	-12.87	1.55	-86.65	14.19
380.	6.73	-10.70	2.35	-31.45	14.36
390.	4.81	-13.78	2.05	-21.67	14.53
400.	3.36	-13.25	2.59	3.15	14.70
410.	3.39	-21.41	1.00	-76.49	14.91
420.	3.91	-17.91	1.41	88.47	15.12


CAL FILE 1
DATA FILE 1
1/2"BELOW GP,1"BORDER
18 NOV 92
TAGGANT
CAL FILE 2
DATA FILE 2
NAME: TGNTSG1 1D21IN1
THETA: -.02 .03
PHI: .00 -.04
SLIDE: -69.35 96.98
SOURCE: .01 .03
NAME: TGNTSG3 1D21IN2
THETA: -.02 .03
PHI: 89.97 -.04
SLIDE: -69.35 96.94
SOURCE: 89.99 89.98
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250 270 290 310 330 350 370 390 410 430
FREQUENCY MHz
MAX 6.01 AT 370
MIN .15 AT 410
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

1/2"BELOW GP,1"BORDER 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE: -.02 PHI ANGLE: .00

SLIDE ANGLE: -69.35 SOURCE ANGLE: .01

CAL FILE #2 : TGNTSG3

THETA ANGLE: -.02 PHI ANGLE: 89.97

SLIDE ANGLE: -69.35 SOURCE ANGLE: 89.99

DATA FILE #1 :1D21IN1

THETA ANGLE: .03 PHI ANGLE: -.04

SLIDE ANGLE: 96.98 SOURCE ANGLE: .03

DATA FILE #2 :1D21IN2

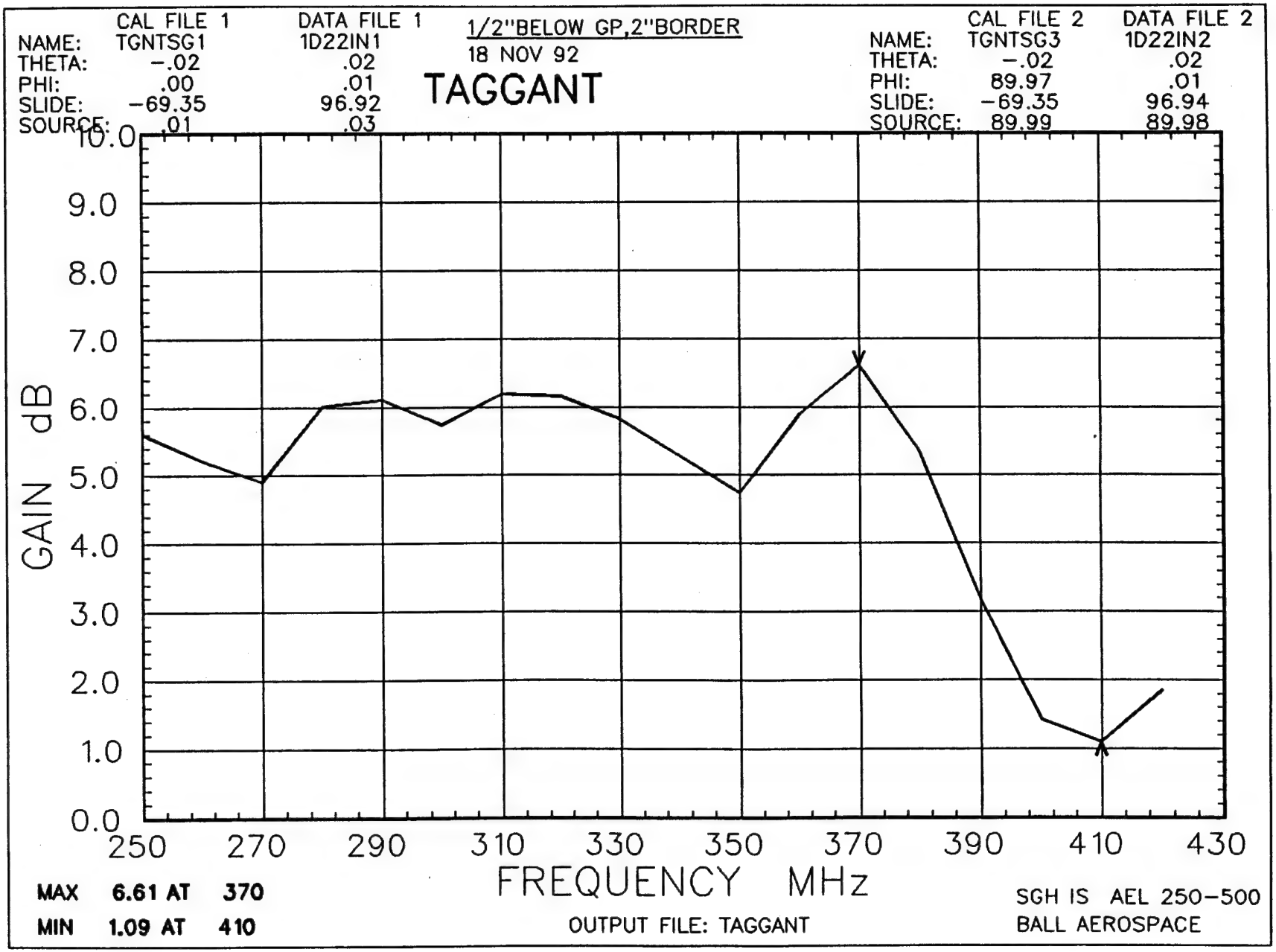
THETA ANGLE: .03 PHI ANGLE: -.04

SLIDE ANGLE: 96.94 SOURCE ANGLE: 89.98

OUTPUT FILE: TAGGANT

GAIN STANDARD: AEL 250-500

FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	4.83	-1.70	8.89	-83.11	11.30
260.	4.44	-.39	11.34	41.64	11.57
270.	4.35	-3.45	7.51	-45.71	11.84
280.	5.39	-4.56	5.72	24.91	12.11
290.	5.59	-4.60	5.56	84.60	12.38
300.	5.35	-6.83	4.37	-32.77	12.65
310.	5.70	-6.46	4.38	15.57	12.89
320.	5.70	-5.93	4.66	68.76	13.13
330.	5.49	-8.23	3.63	-71.38	13.37
340.	4.97	-12.66	2.29	-79.03	13.61
350.	4.29	-8.20	4.21	30.85	13.85
360.	5.29	-7.78	3.92	52.94	14.02
370.	6.01	-10.20	2.71	59.84	14.19
380.	4.89	-26.26	.48	1.81	14.36
390.	2.63	-17.71	1.68	3.88	14.53
400.	.75	-13.56	3.39	13.80	14.70
410.	.15	-17.70	2.24	37.33	14.91
420.	.81	-15.44	2.70	37.92	15.12


CAL FILE 1
DATA FILE 1
1/2"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
CAL FILE 2
DATA FILE 2
NAME: TGNTSG1 1D22IN1
THETA: -.02 .02
PHI: .00 .01
SLIDE: -69.35 96.92
SOURCE: .01 .03
NAME: TGNTSG3 1D22IN2
THETA: -.02 .02
PHI: 89.97 .01
SLIDE: -69.35 96.94
SOURCE: 89.99 89.98
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250 270 290 310 330 350 370 390 410 430
FREQUENCY MHz
MAX 6.61 AT 370
MIN 1.09 AT 410
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

1/2"BELOW GP,2"BORDER 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE: -.02 PHI ANGLE: .00

SLIDE ANGLE: -69.35 SOURCE ANGLE: .01

CAL FILE #2 : TGNTSG3

THETA ANGLE: -.02 PHI ANGLE: 89.97

SLIDE ANGLE: -69.35 SOURCE ANGLE: 89.99

DATA FILE #1 :1D22IN1

THETA ANGLE: .02 PHI ANGLE: .01

SLIDE ANGLE: 96.92 SOURCE ANGLE: .03

DATA FILE #2 :1D22IN2

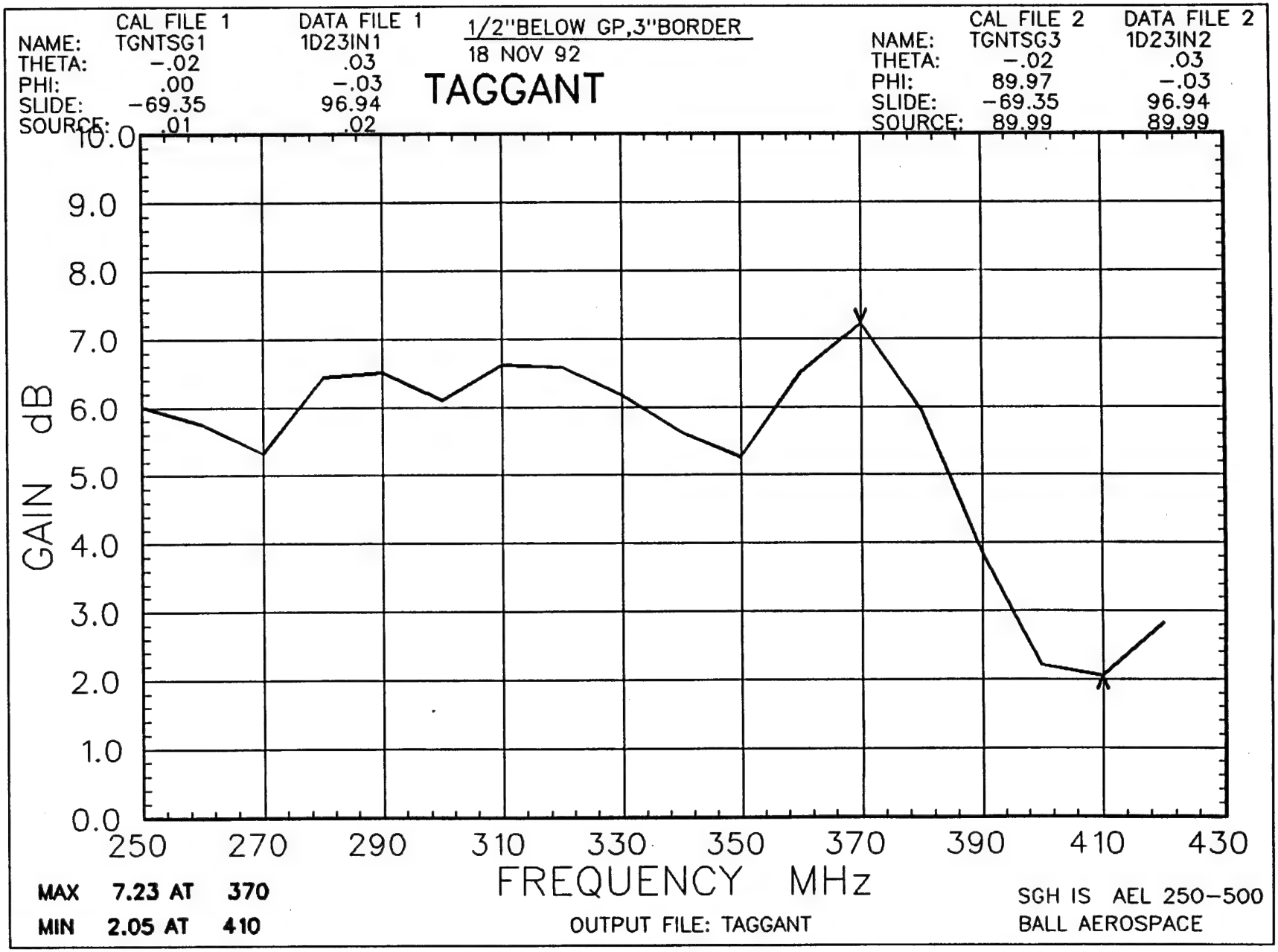
THETA ANGLE: .02 PHI ANGLE: .01

SLIDE ANGLE: 96.94 SOURCE ANGLE: 89.98

OUTPUT FILE: TAGGANT

GAIN STANDARD: AEL 250-500

FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	5.60	-3.49	6.37	-84.94	11.30
260.	5.21	-.96	9.34	39.51	11.57
270.	4.90	-3.64	6.83	-40.68	11.84
280.	6.02	-6.04	4.43	24.38	12.11
290.	6.11	-5.89	4.46	85.40	12.38
300.	5.74	-6.61	4.28	-27.55	12.65
310.	6.19	-7.46	3.66	15.49	12.89
320.	6.16	-6.95	3.91	70.22	13.13
330.	5.83	-9.02	3.18	-64.07	13.37
340.	5.29	-13.49	2.01	-74.13	13.61
350.	4.74	-8.76	3.73	31.72	13.85
360.	5.89	-9.50	2.98	57.16	14.02
370.	6.61	-12.21	2.00	63.87	14.19
380.	5.36	-19.19	1.03	-14.51	14.36
390.	3.19	-16.68	1.77	-.49	14.53
400.	1.43	-13.13	3.29	12.78	14.70
410.	1.09	-21.23	1.33	39.55	14.91
420.	1.85	-17.91	1.79	42.57	15.12


CAL FILE 1
DATA FILE 1
1/2"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
CAL FILE 2
DATA FILE 2
NAME: TGNTSG1 1D23IN1
THETA: -.02 .03
PHI: .00 -.03
SLIDE: -69.35 96.94
SOURCE: .01 .02
NAME: TGNTSG3 1D23IN2
THETA: -.02 .03
PHI: 89.97 -.03
SLIDE: -69.35 96.94
SOURCE: 89.99 89.99
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250 270 290 310 330 350 370 390 410 430
FREQUENCY MHz
MAX 7.23 AT 370
MIN 2.05 AT 410
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

1/2"BELOW GP,3"BORDER 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE:	-.02	PHI ANGLE:	.00
SLIDE ANGLE:	-69.35	SOURCE ANGLE:	.01

CAL FILE #2 : TGNTSG3

THETA ANGLE:	-.02	PHI ANGLE:	89.97
SLIDE ANGLE:	-69.35	SOURCE ANGLE:	89.99

DATA FILE #1 :1D23IN1

THETA ANGLE:	.03	PHI ANGLE:	-.03
SLIDE ANGLE:	96.94	SOURCE ANGLE:	.02

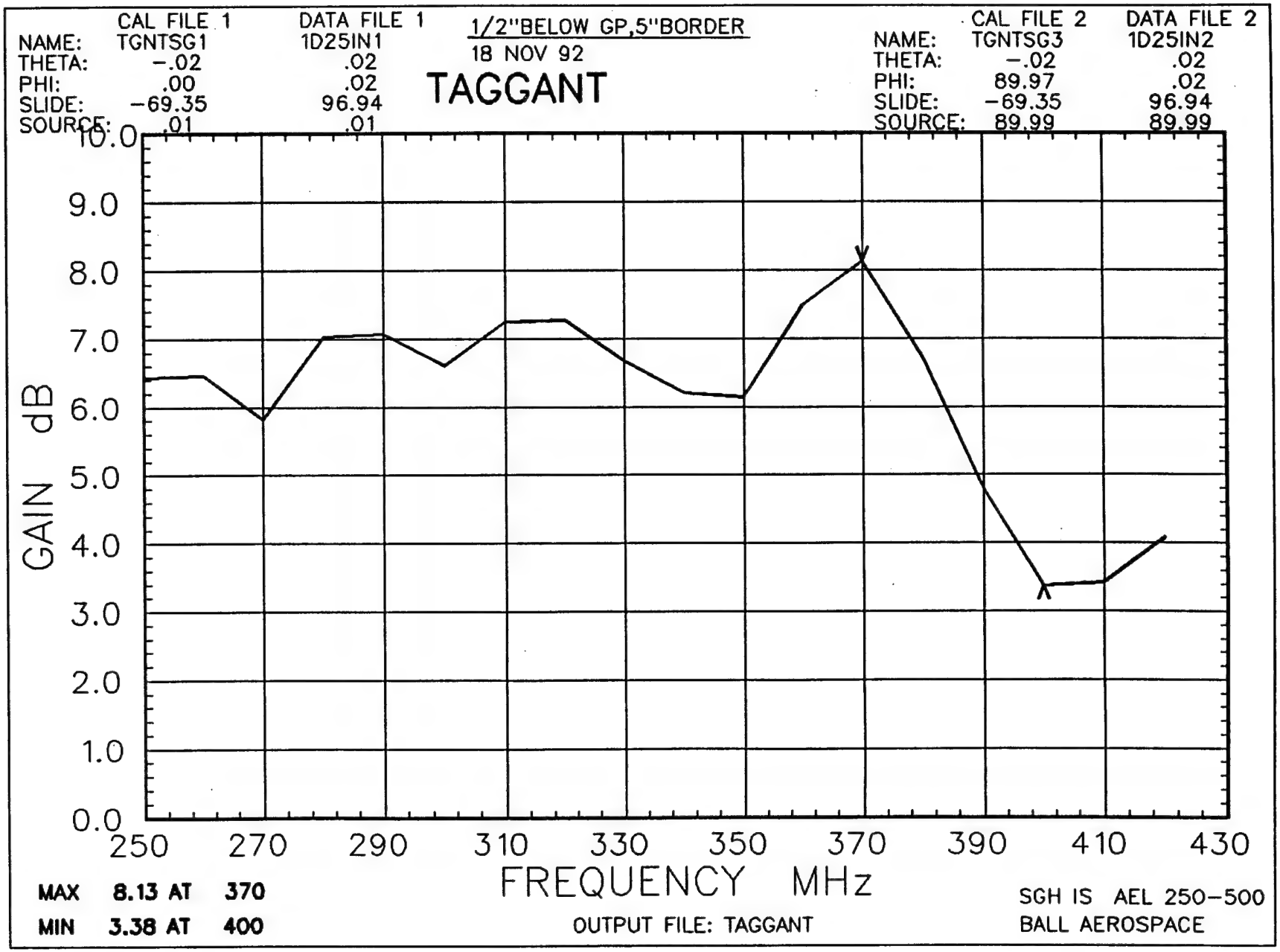
DATA FILE #2 :1D23IN2

THETA ANGLE:	.03	PHI ANGLE:	-.03
SLIDE ANGLE:	96.94	SOURCE ANGLE:	89.99

OUTPUT FILE: TAGGANT

GAIN STANDARD: AEL 250-500

FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	6.01	-5.40	4.79	-85.57	11.30
260.	5.75	-1.62	7.95	37.71	11.57
270.	5.32	-3.66	6.46	-37.98	11.84
280.	6.44	-7.44	3.56	24.01	12.11
290.	6.51	-6.99	3.73	87.51	12.38
300.	6.10	-6.17	4.32	-24.44	12.65
310.	6.62	-8.35	3.13	15.09	12.89
320.	6.59	-7.88	3.33	72.63	13.13
330.	6.18	-8.82	3.12	-57.87	13.37
340.	5.63	-13.44	1.94	-67.68	13.61
350.	5.26	-9.21	3.32	32.01	13.85
360.	6.50	-10.61	2.44	62.87	14.02
370.	7.23	-14.18	1.48	72.54	14.19
380.	5.94	-14.83	1.59	-21.23	14.36
390.	3.84	-15.33	1.92	-6.34	14.53
400.	2.20	-12.64	3.18	10.74	14.70
410.	2.05	-28.12	.54	49.82	14.91
420.	2.83	-21.54	1.05	55.06	15.12


CAL FILE 1
DATA FILE 1
1/2"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
CAL FILE 2
DATA FILE 2
NAME: TGNTSG1 1D25IN1
THETA: -.02 .02
PHI: .00 .02
SLIDE: -69.35 96.94
SOURCE: .01 .01
NAME: TGNTSG3 1D25IN2
THETA: -.02 .02
PHI: 89.97 .02
SLIDE: -69.35 96.94
SOURCE: 89.99 89.99
GAIN dB
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250 270 290 310 330 350 370 390 410 430
FREQUENCY MHz
MAX 8.13 AT 370
MIN 3.38 AT 400
OUTPUT FILE: TAGGANT
SGH IS AEL 250-500
BALL AEROSPACE

TAGGANT

1/2"BELOW GP,5"BORDER 18 NOV 92

CAL FILE #1 : TGNTSG1

THETA ANGLE: -.02 PHI ANGLE: .00

SLIDE ANGLE: -69.35 SOURCE ANGLE: .01

CAL FILE #2 : TGNTSG3

THETA ANGLE: -.02 PHI ANGLE: 89.97

SLIDE ANGLE: -69.35 SOURCE ANGLE: 89.99

DATA FILE #1 :1D25IN1

THETA ANGLE: .02 PHI ANGLE: .02

SLIDE ANGLE: 96.94 SOURCE ANGLE: .01

DATA FILE #2 :1D25IN2

THETA ANGLE: .02 PHI ANGLE: .02

SLIDE ANGLE: 96.94 SOURCE ANGLE: 89.99

OUTPUT FILE: TAGGANT

GAIN STANDARD: AEL 250-500

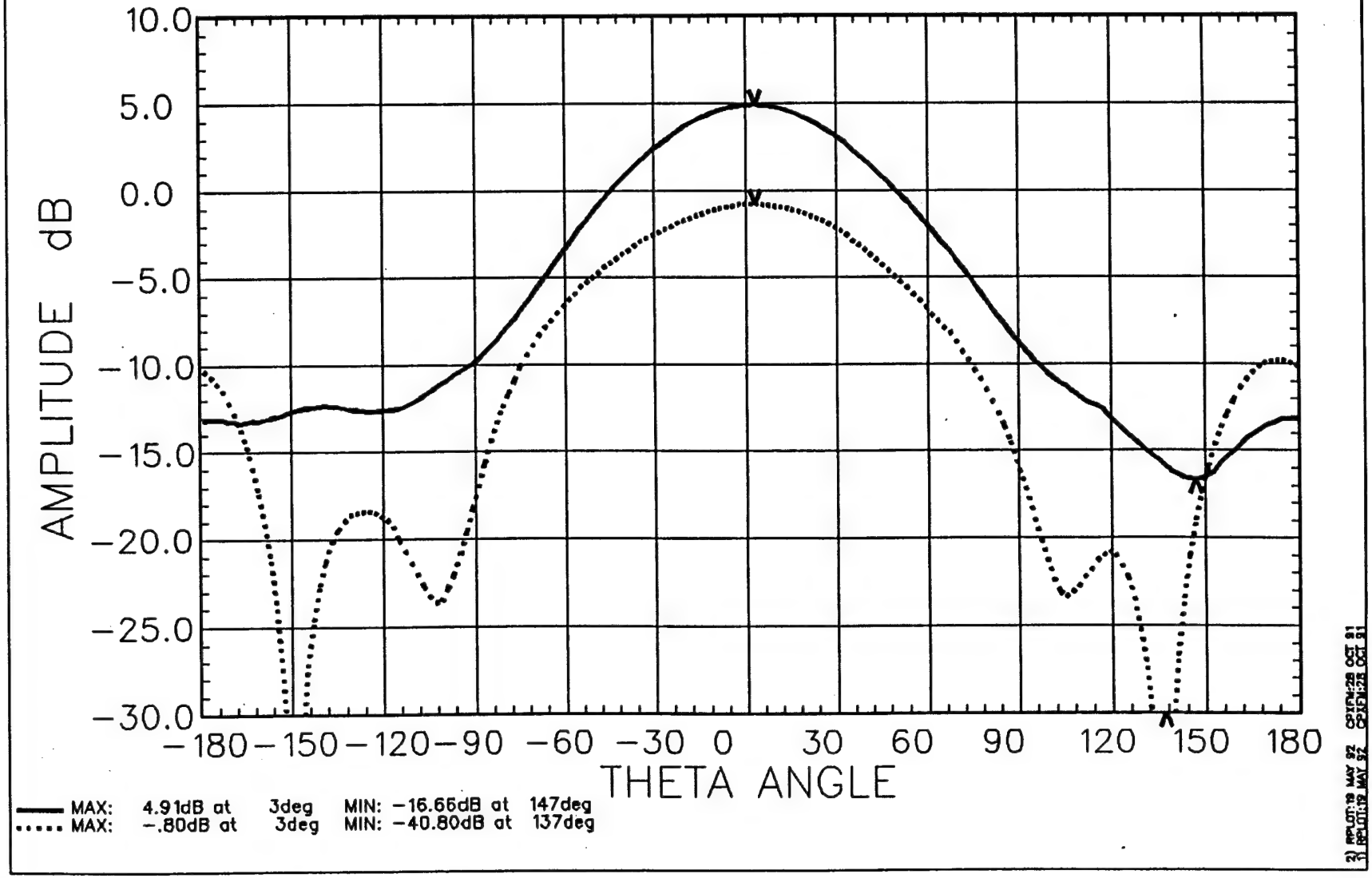
FREQ MHz	RHCP GAIN	LHCP GAIN	AXIAL RATIO	TILT ANGLE	SGH GAIN
250.	6.44	-7.37	3.59	-74.31	11.30
260.	6.46	-3.55	5.68	38.78	11.57
270.	5.82	-3.13	6.49	-33.48	11.84
280.	7.03	-10.64	2.28	24.65	12.11
290.	7.08	-7.70	3.21	-81.36	12.38
300.	6.60	-4.97	4.69	-21.59	12.65
310.	7.25	-10.09	2.37	14.62	12.89
320.	7.27	-8.54	2.84	83.93	13.13
330.	6.68	-6.58	3.83	-49.79	13.37
340.	6.20	-10.46	2.57	-57.99	13.61
350.	6.14	-10.99	2.43	35.42	13.85
360.	7.49	-10.46	2.21	80.68	14.02
370.	8.13	-12.62	1.60	-82.34	14.19
380.	6.73	-10.36	2.44	-28.32	14.36
390.	4.80	-13.32	2.17	-16.44	14.53
400.	3.38	-12.81	2.72	7.01	14.70
410.	3.42	-19.96	1.18	-72.78	14.91
420.	4.08	-17.45	1.46	-84.33	15.12

1/8"BELOW GP,1"BORDER
18 NOV 92

TAGGANT

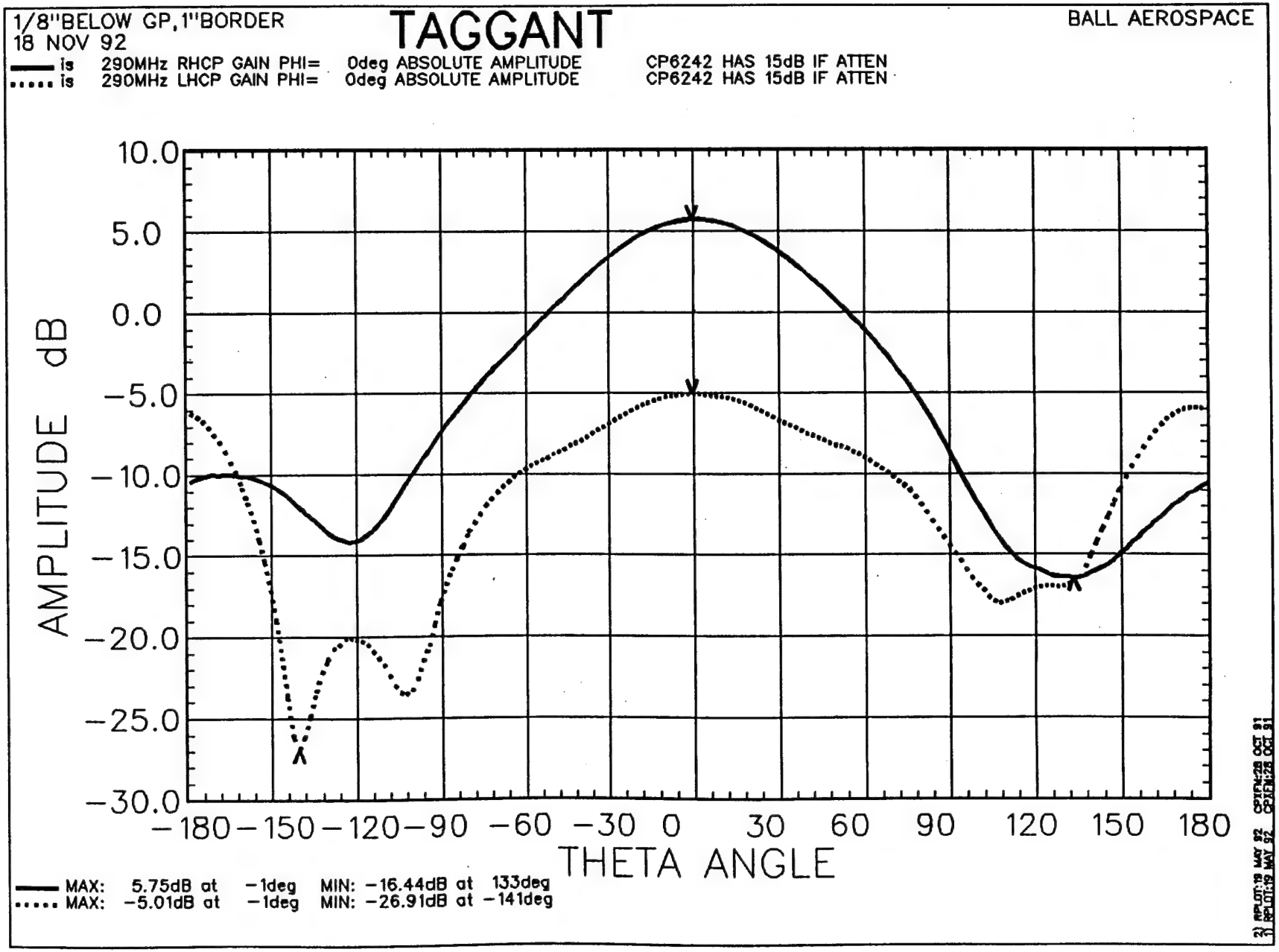
BALL AEROSPACE

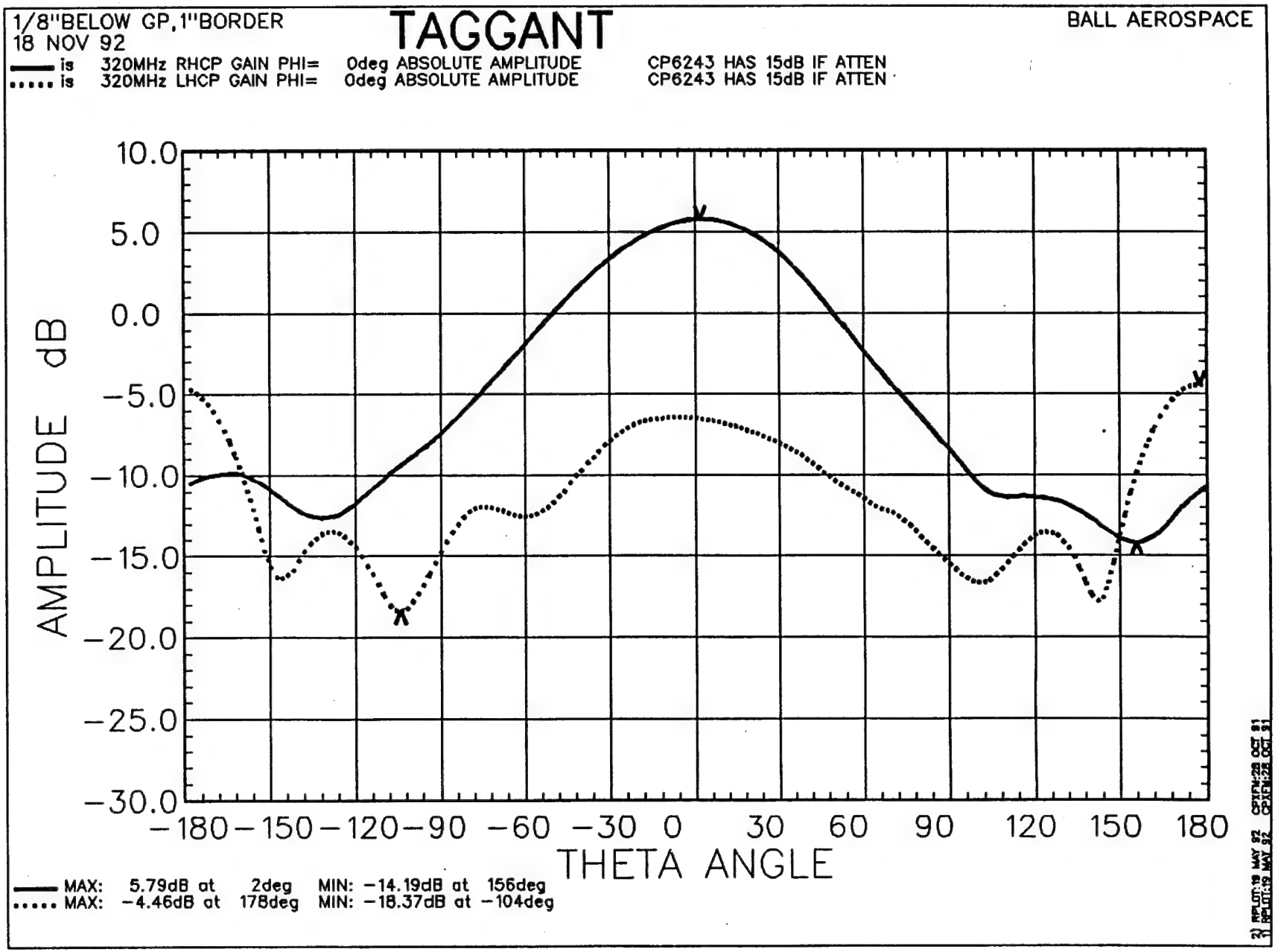
—— is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6241 HAS 15dB IF ATTEN
..... is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6241 HAS 15dB IF ATTEN

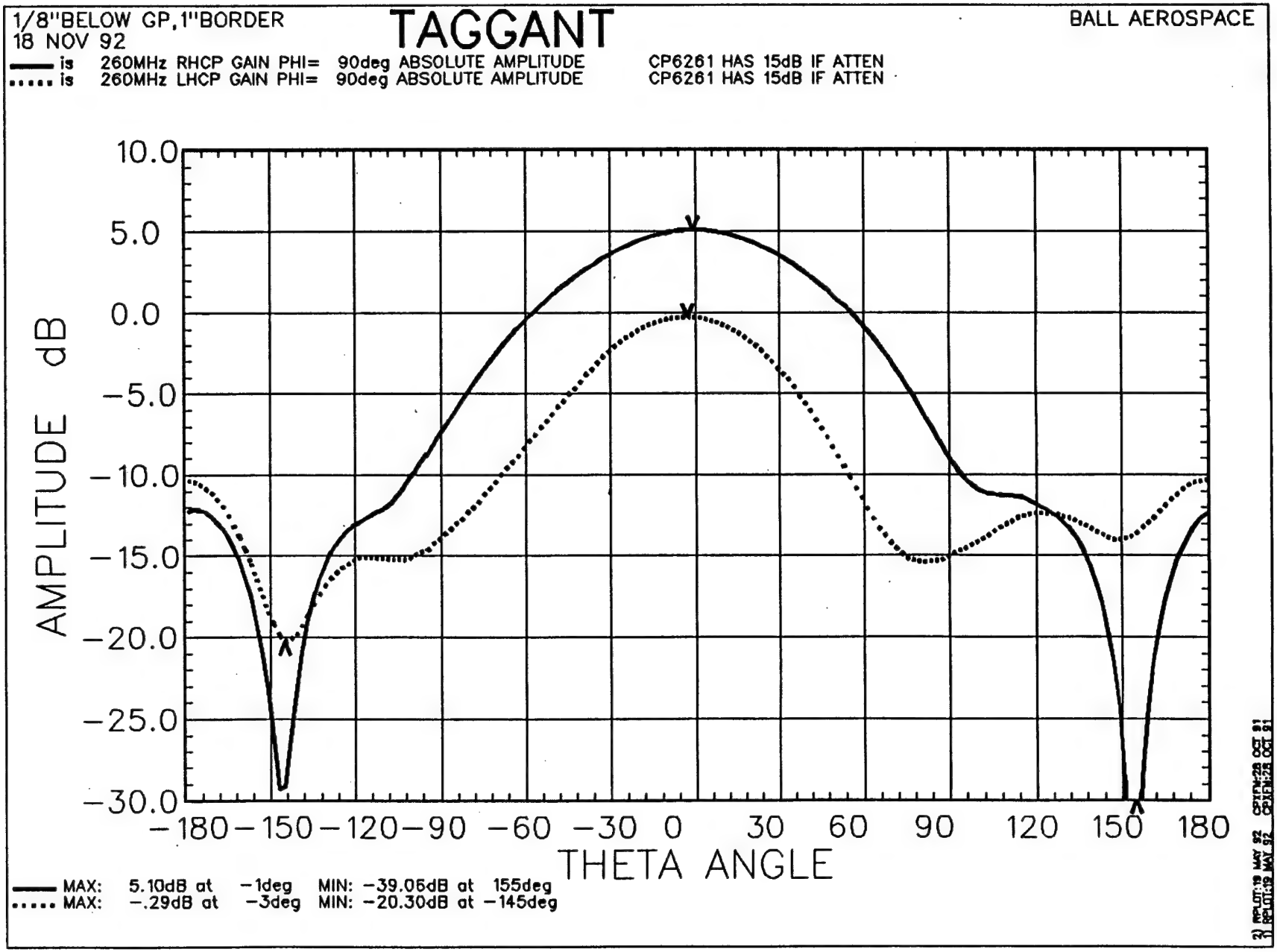


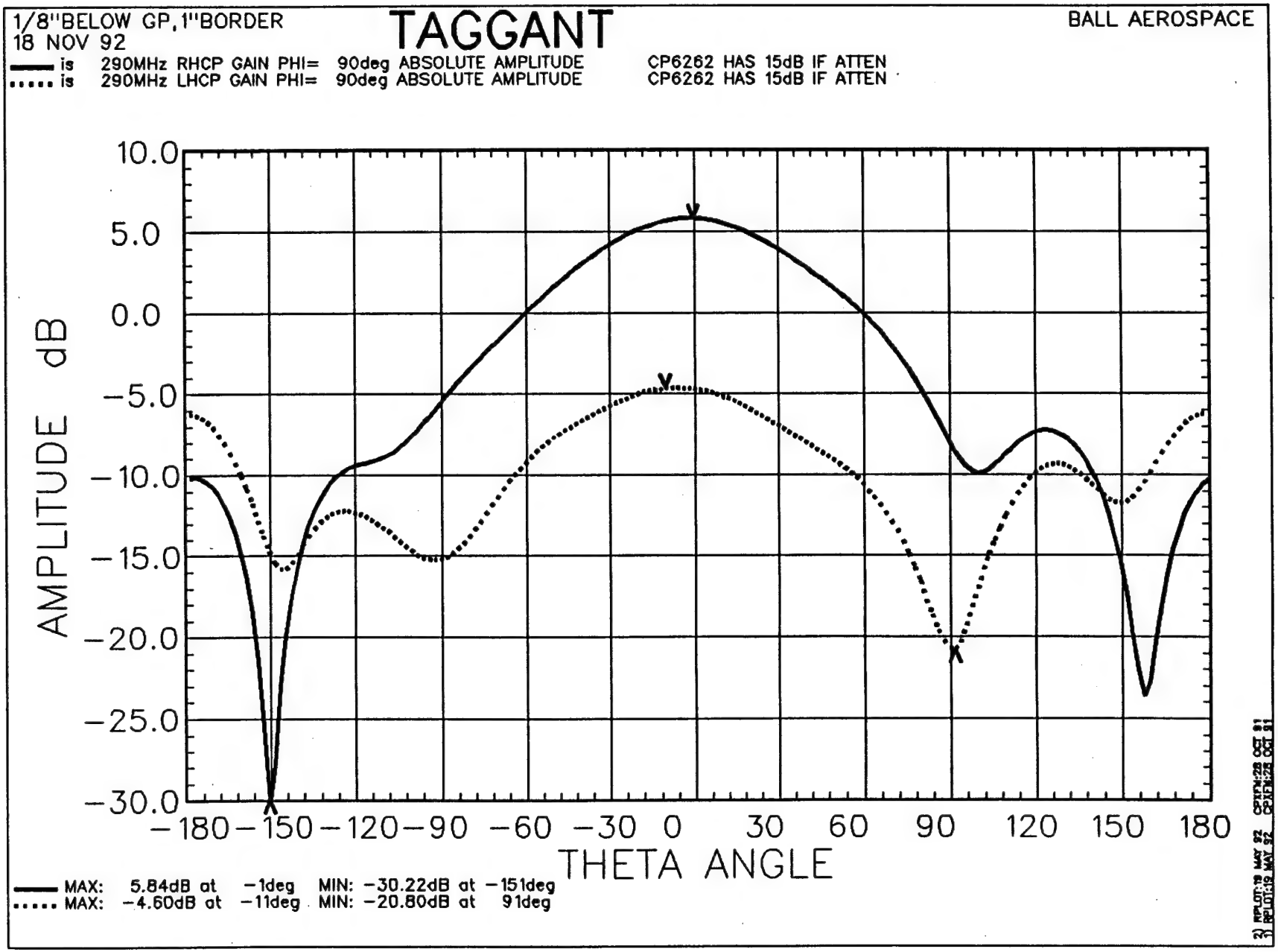
—— MAX: 4.91dB at 3deg MIN: −16.66dB at 147deg
..... MAX: −.80dB at 3deg MIN: −40.80dB at 137deg

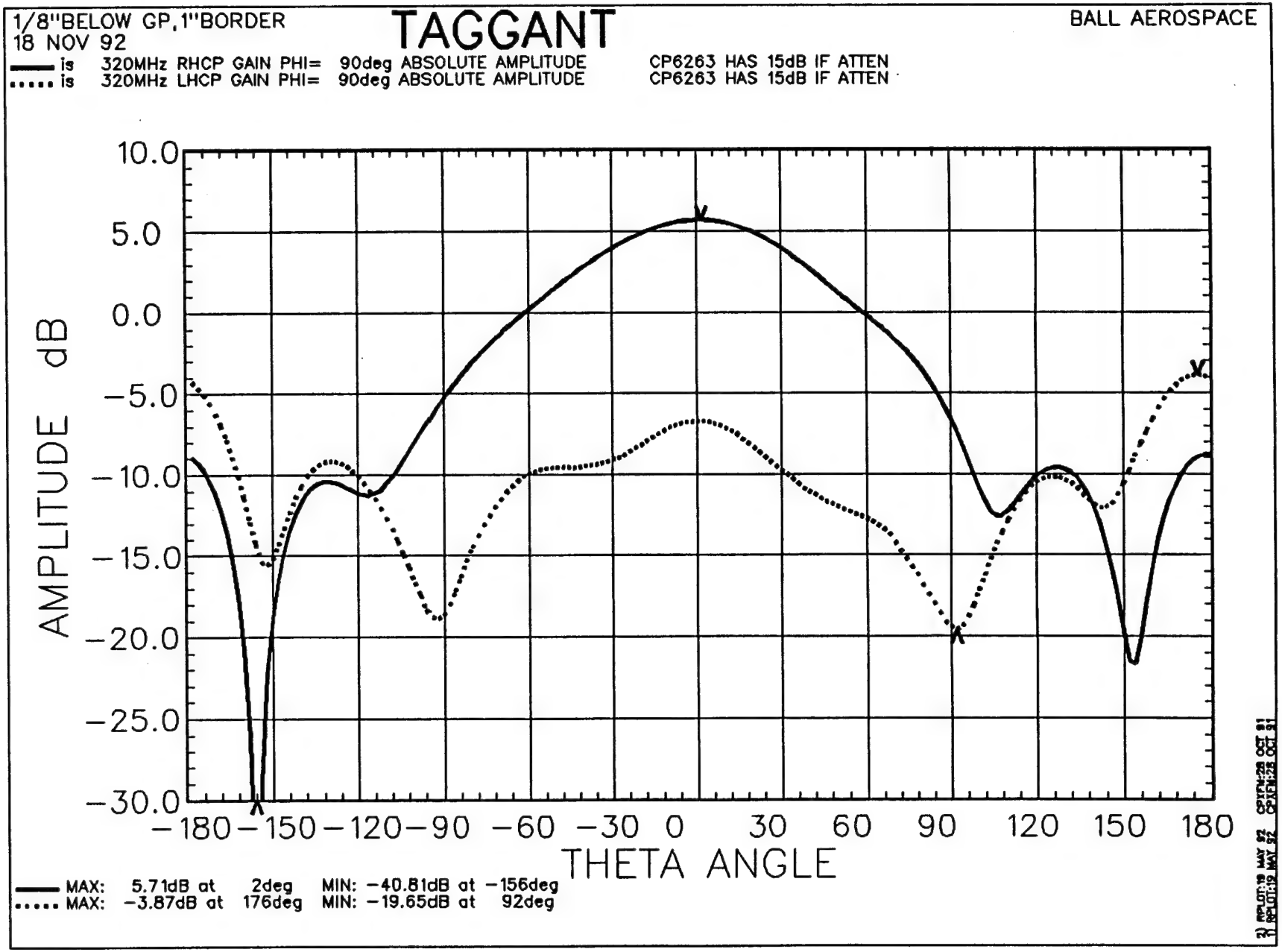
2) RPLOT:19 MAY 92 CP3174:29 OCT 91
3) RPLOT:19 MAY 92 CP3174:29 OCT 91

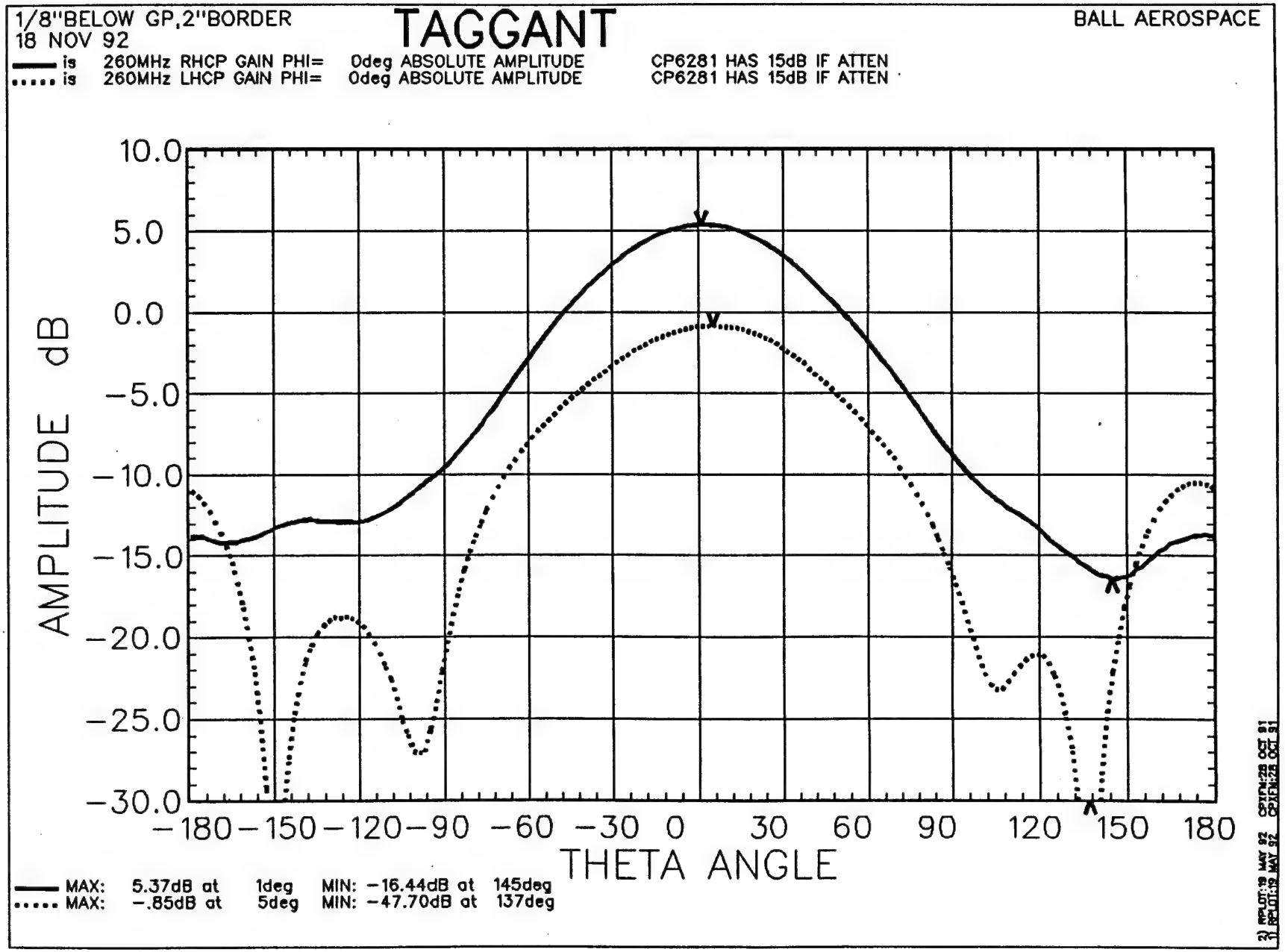

1/8"BELOW GP,1"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6242 HAS 15dB IF ATTEN
is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6242 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.75dB at -1deg MIN: -16.44dB at 133deg
MAX: -5.01dB at -1deg MIN: -26.91dB at -141deg

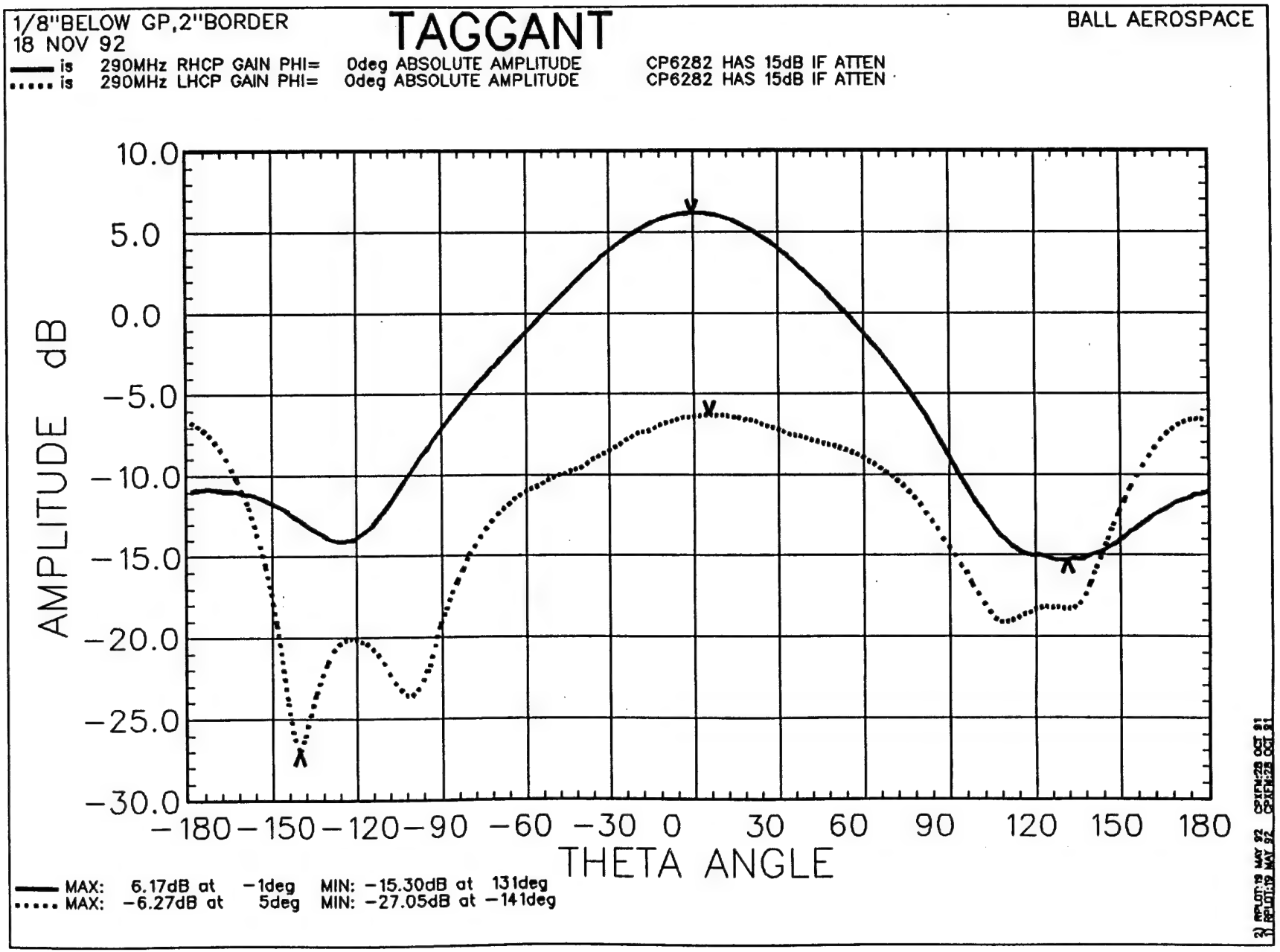

1/8"BELOW GP,1"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6243 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6243 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.79dB at 2deg MIN: -14.19dB at 156deg
MAX: -4.46dB at 178deg MIN: -18.37dB at -104deg

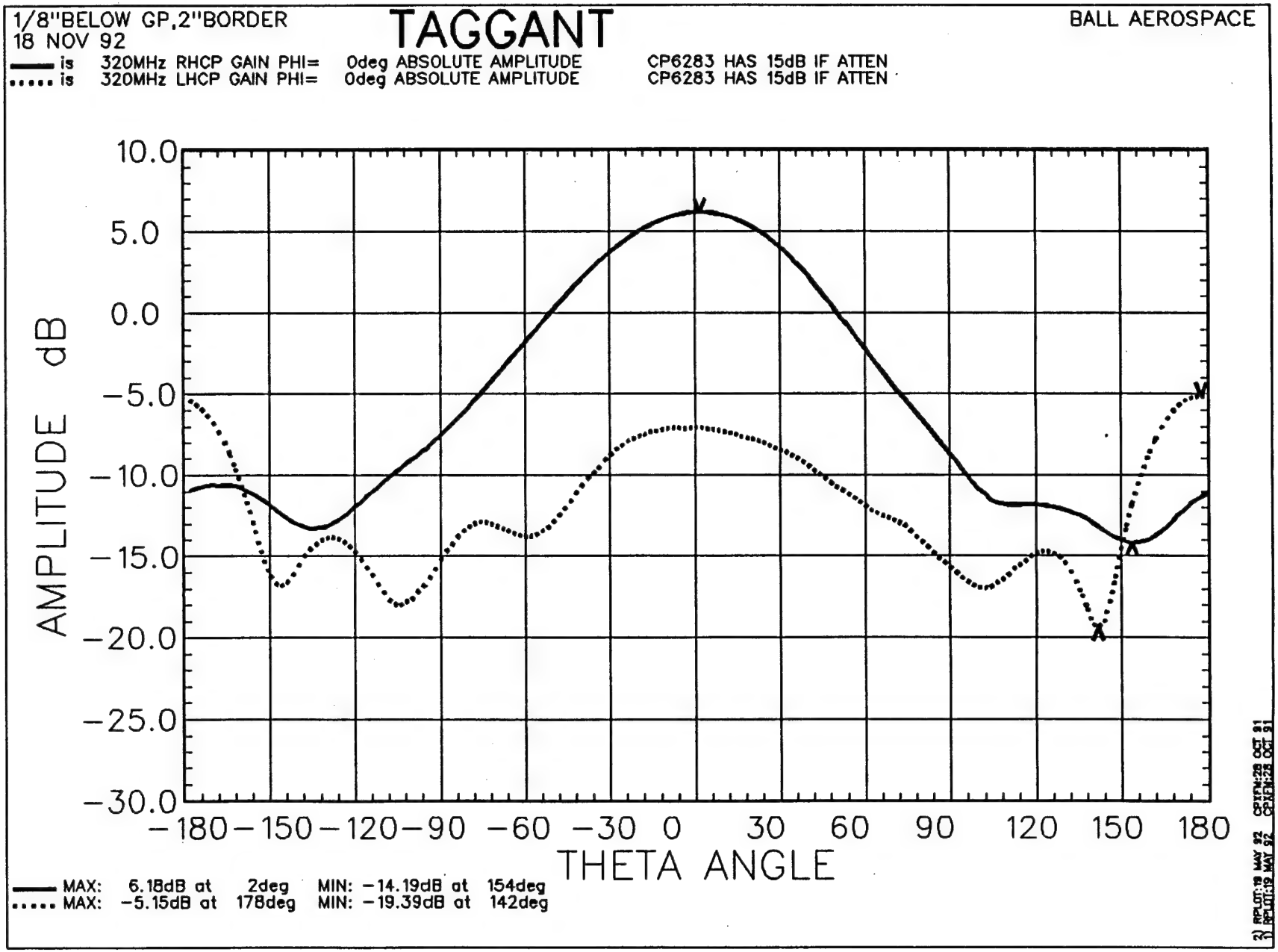

1/8"BELOW GP,1"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6261 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6261 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.10dB at -1deg MIN: -39.06dB at 155deg
MAX: -.29dB at -3deg MIN: -20.30dB at -145deg

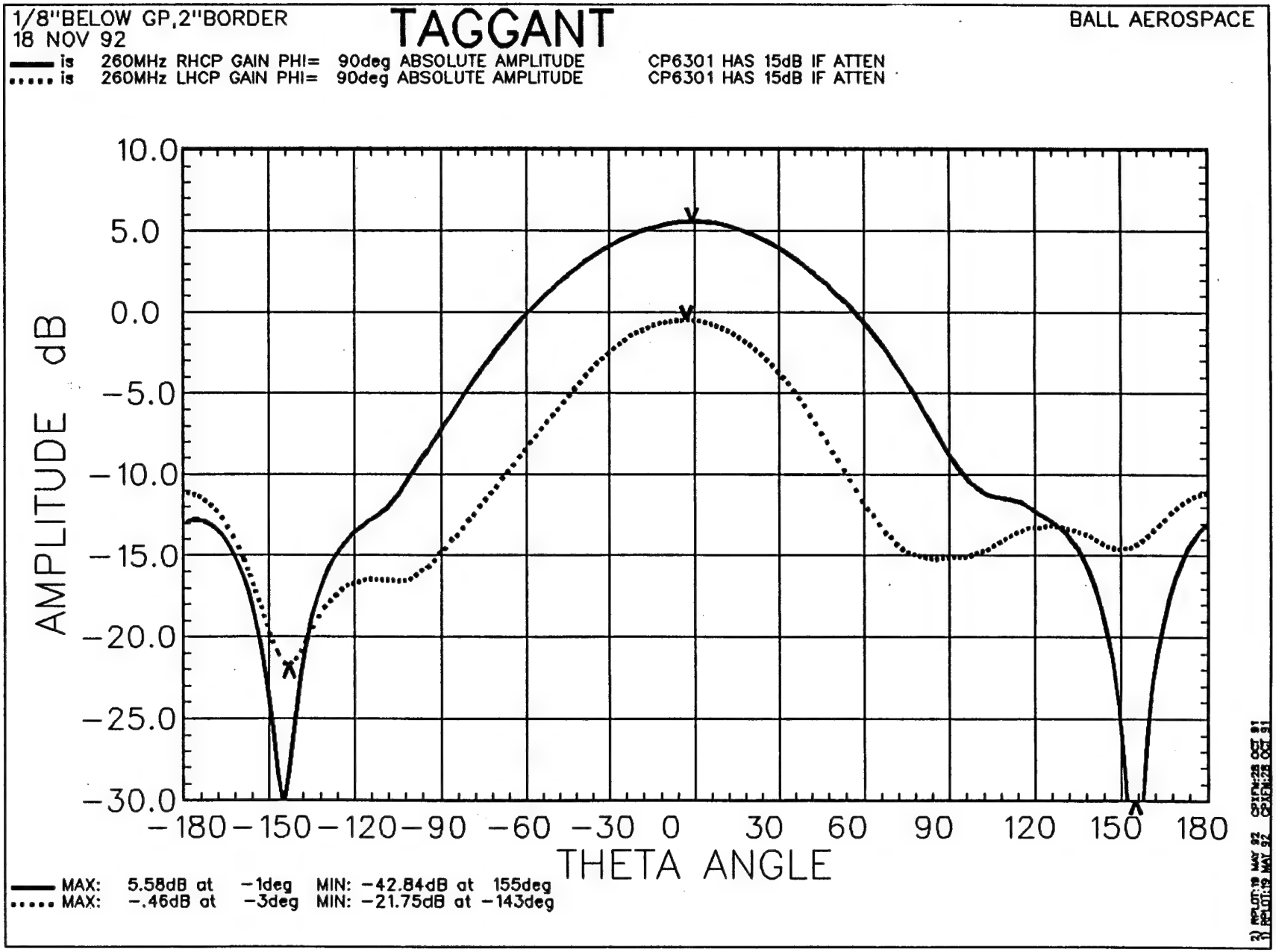

1/8"BELOW GP,1"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
—— is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6262 HAS 15dB IF ATTEN
..... is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6262 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
−5.0
−10.0
−15.0
−20.0
−25.0
−30.0
−180 −150 −120 −90 −60 −30 0 30 60 90 120 150 180
THETA ANGLE
—— MAX: 5.84dB at −1deg MIN: −30.22dB at −151deg
..... MAX: −4.60dB at −11deg MIN: −20.80dB at 91deg


1/8"BELOW GP,1"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6263 HAS 15dB IF ATTEN
CP6263 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.71dB at 2deg MIN: -40.81dB at -156deg
MAX: -3.87dB at 176deg MIN: -19.65dB at 92deg


1/8"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6281 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6281 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.37dB at 1deg MIN: -16.44dB at 145deg
MAX: -.85dB at 5deg MIN: -47.70dB at 137deg
2) RPLOT:19 MAY 92 OPTN:28 OCT 91
1) RPLOT:19 MAY 92 OPTN:28 OCT 91


1/8"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE
CP6282 HAS 15dB IF ATTEN
is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE
CP6282 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.17dB at -1deg MIN: -15.30dB at 131deg
MAX: -6.27dB at 5deg MIN: -27.05dB at -141deg


1/8"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6283 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6283 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.18dB at 2deg MIN: -14.19dB at 154deg
MAX: -5.15dB at 178deg MIN: -19.39dB at 142deg

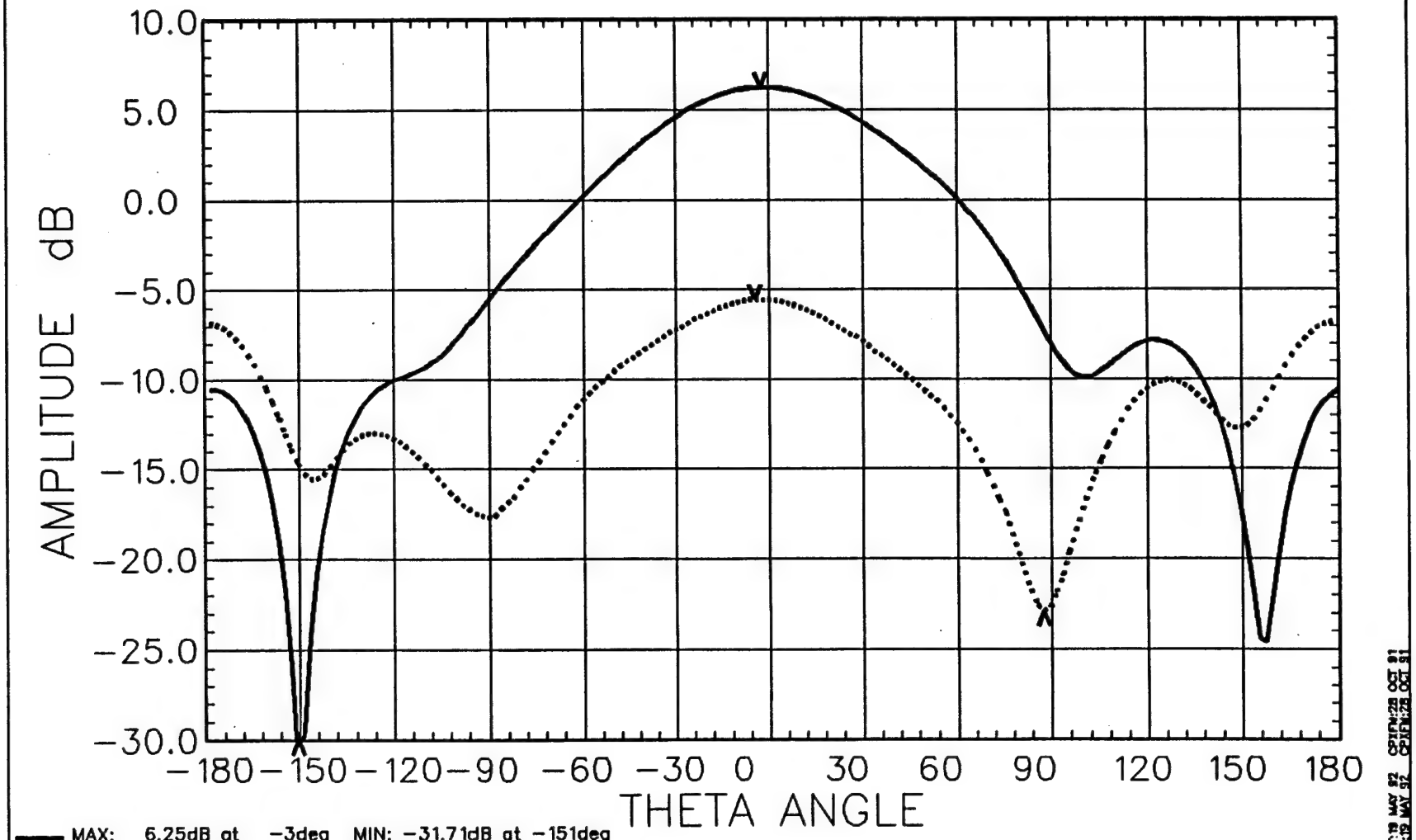

1/8"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6301 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6301 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.58dB at -1deg MIN: -42.84dB at 155deg
MAX: -.46dB at -3deg MIN: -21.75dB at -143deg

1/8"BELOW GP,2"BORDER
18 NOV 92

TAGGANT

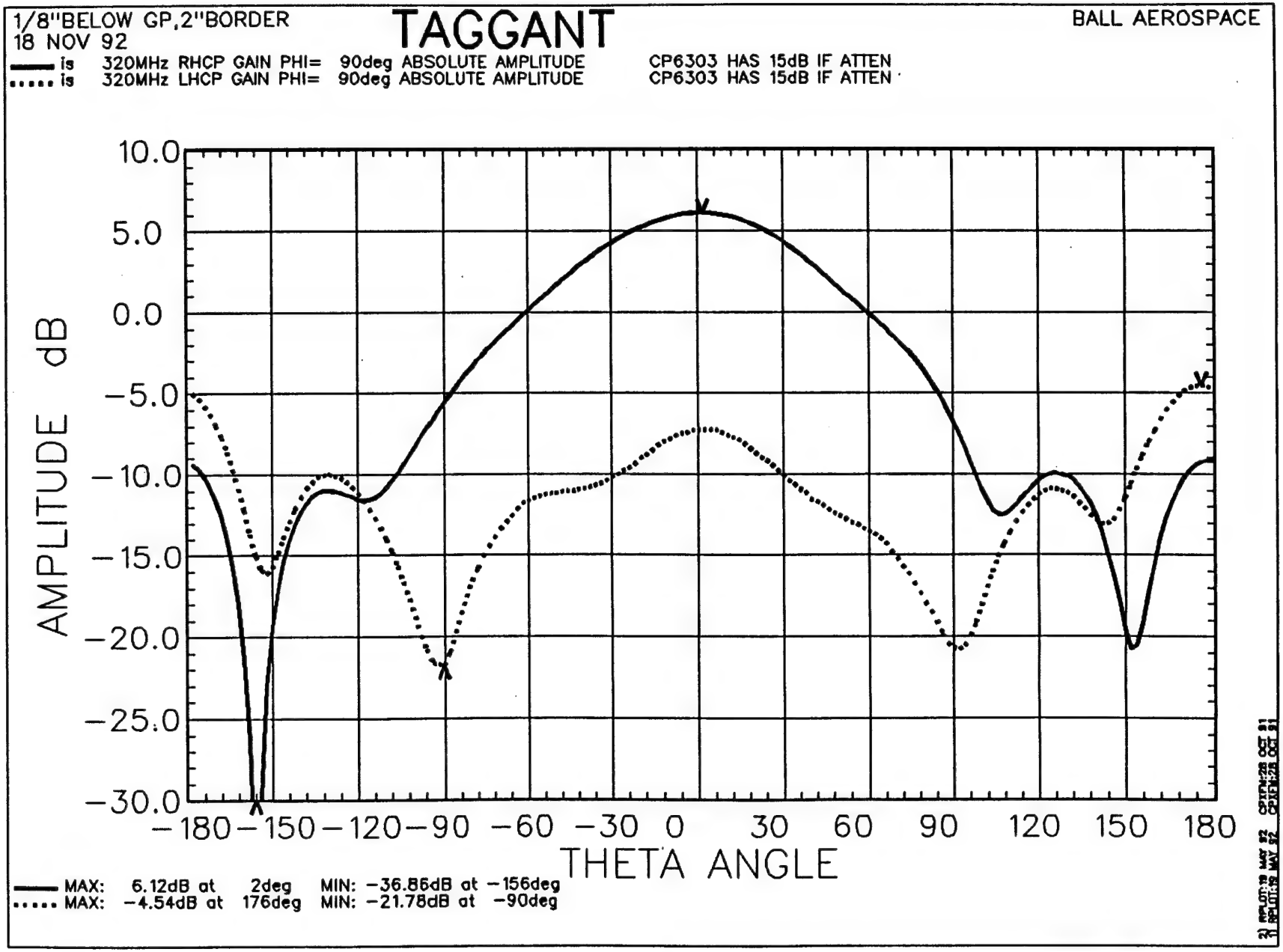
BALL AEROSPACE

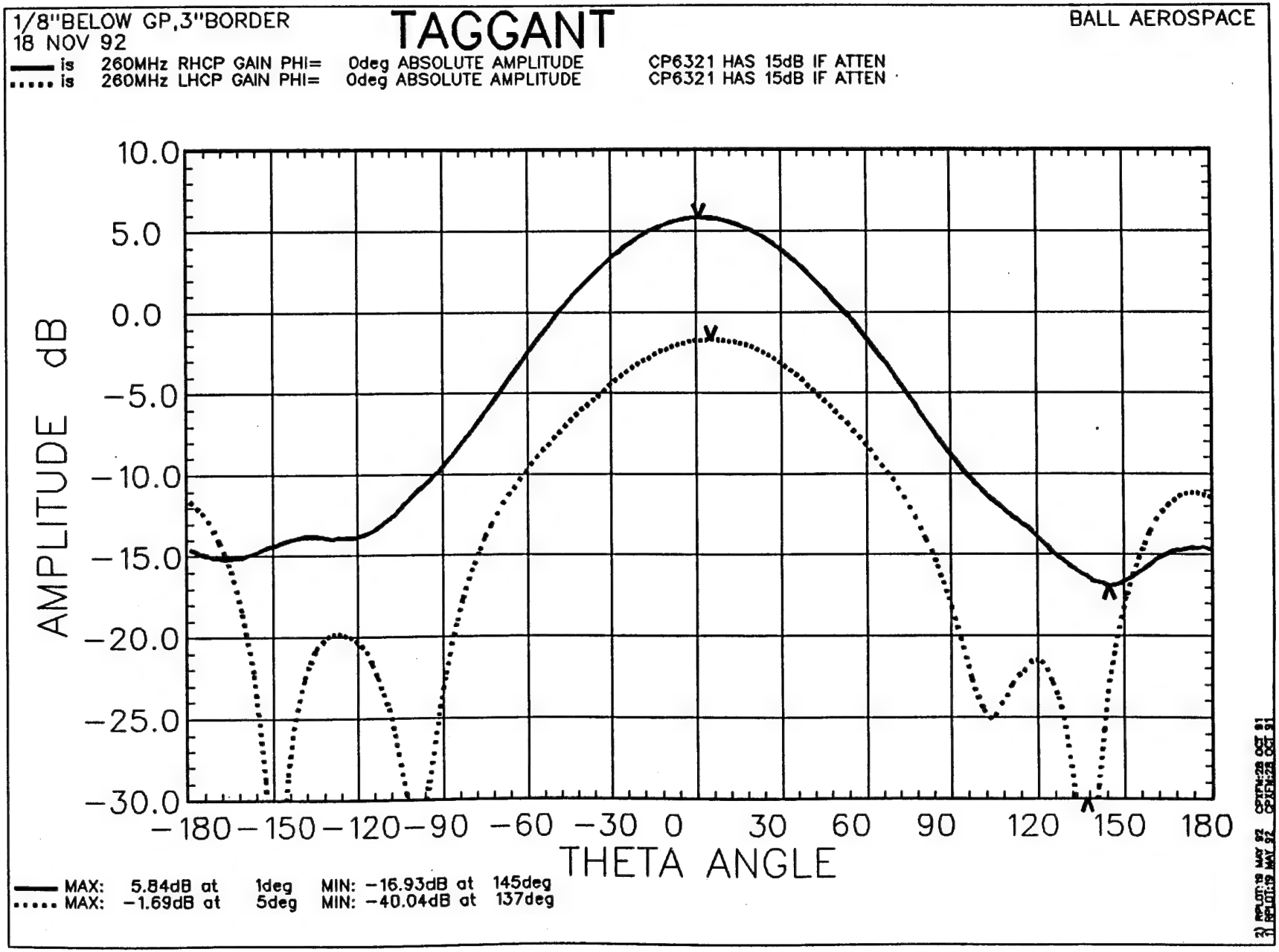
—— is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6302 HAS 15dB IF ATTEN
····· is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6302 HAS 15dB IF ATTEN

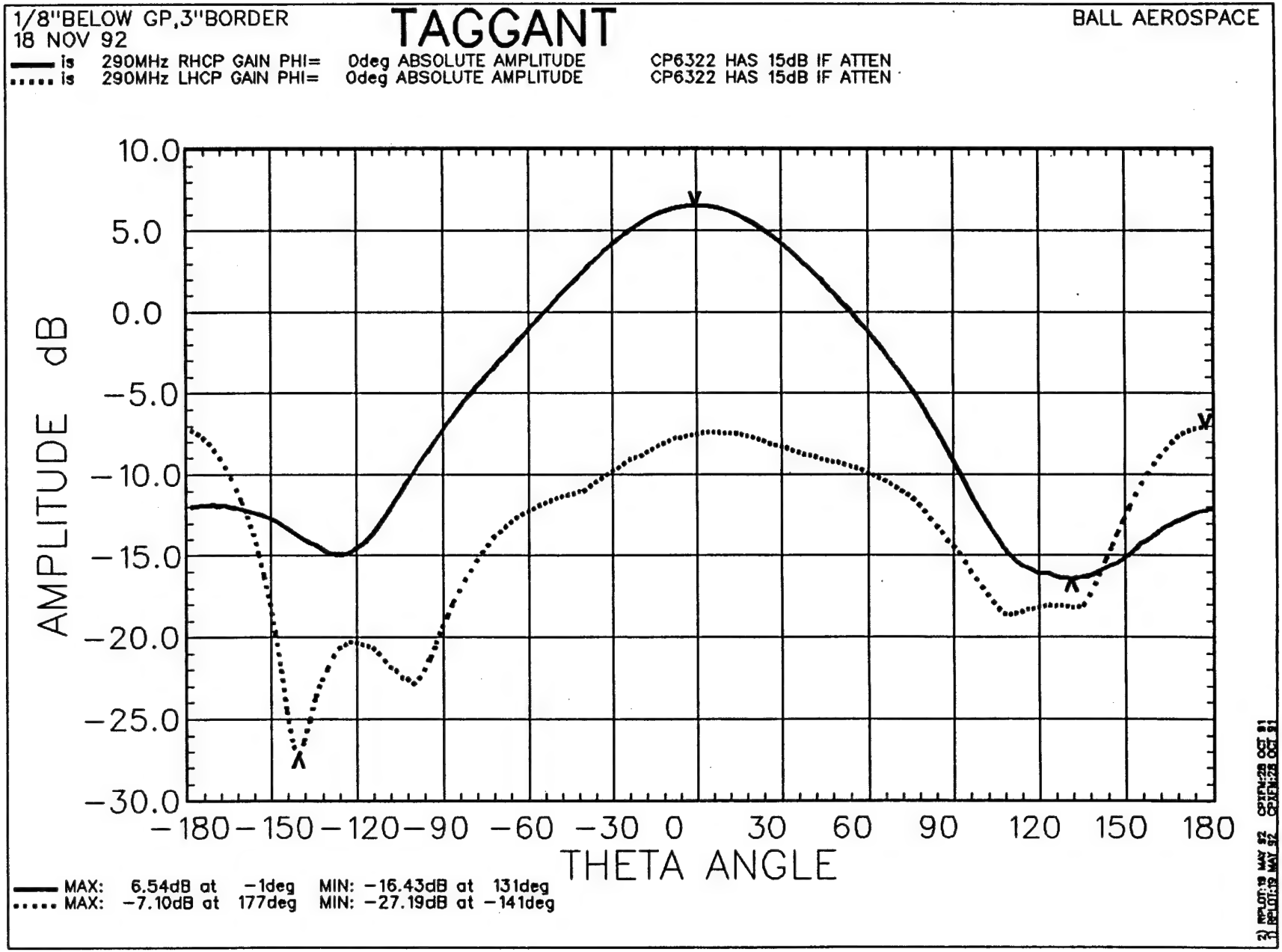


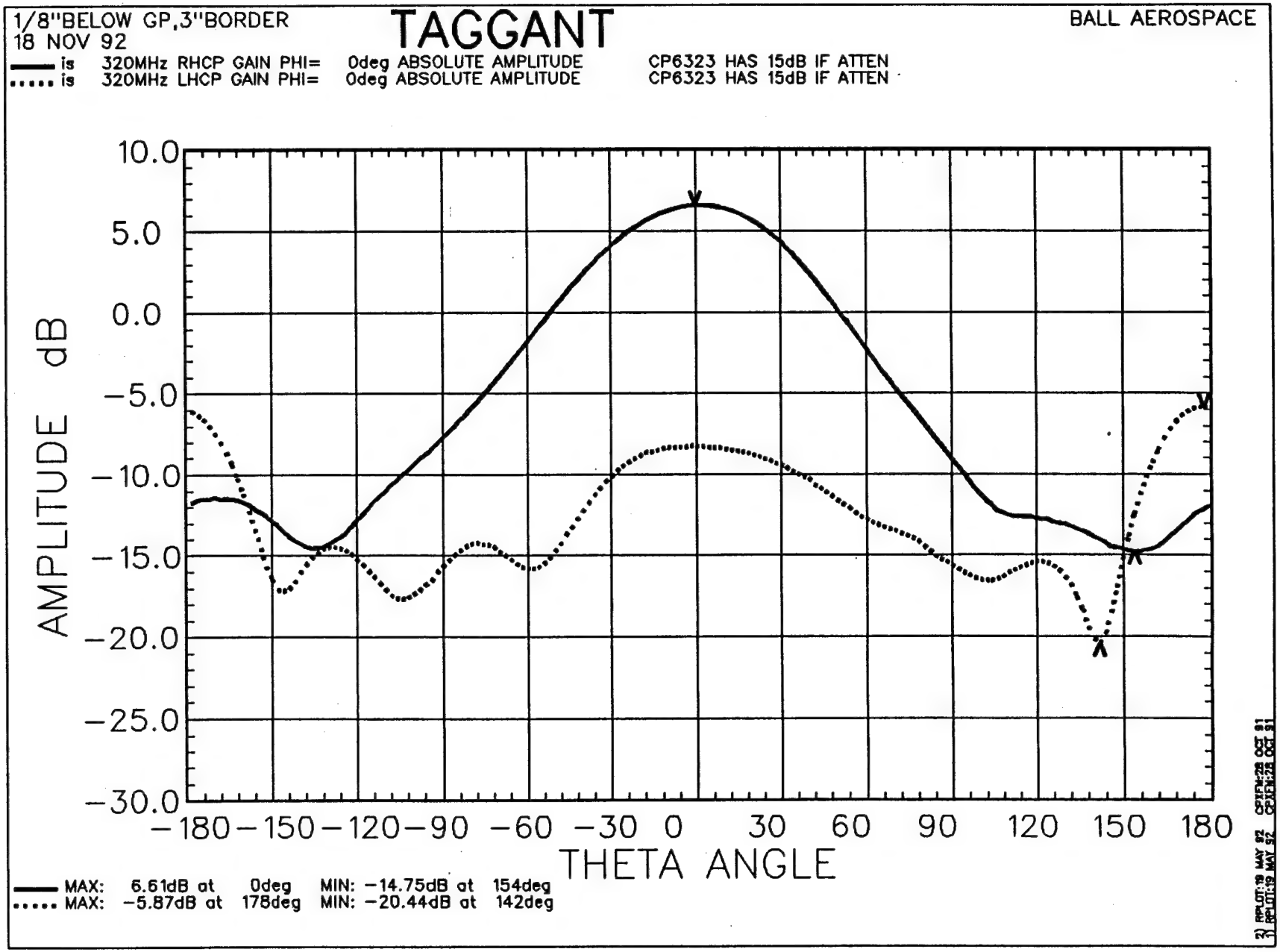
—— MAX: 6.25dB at −3deg MIN: −31.71dB at −151deg
····· MAX: −5.56dB at −5deg MIN: −22.93dB at 87deg

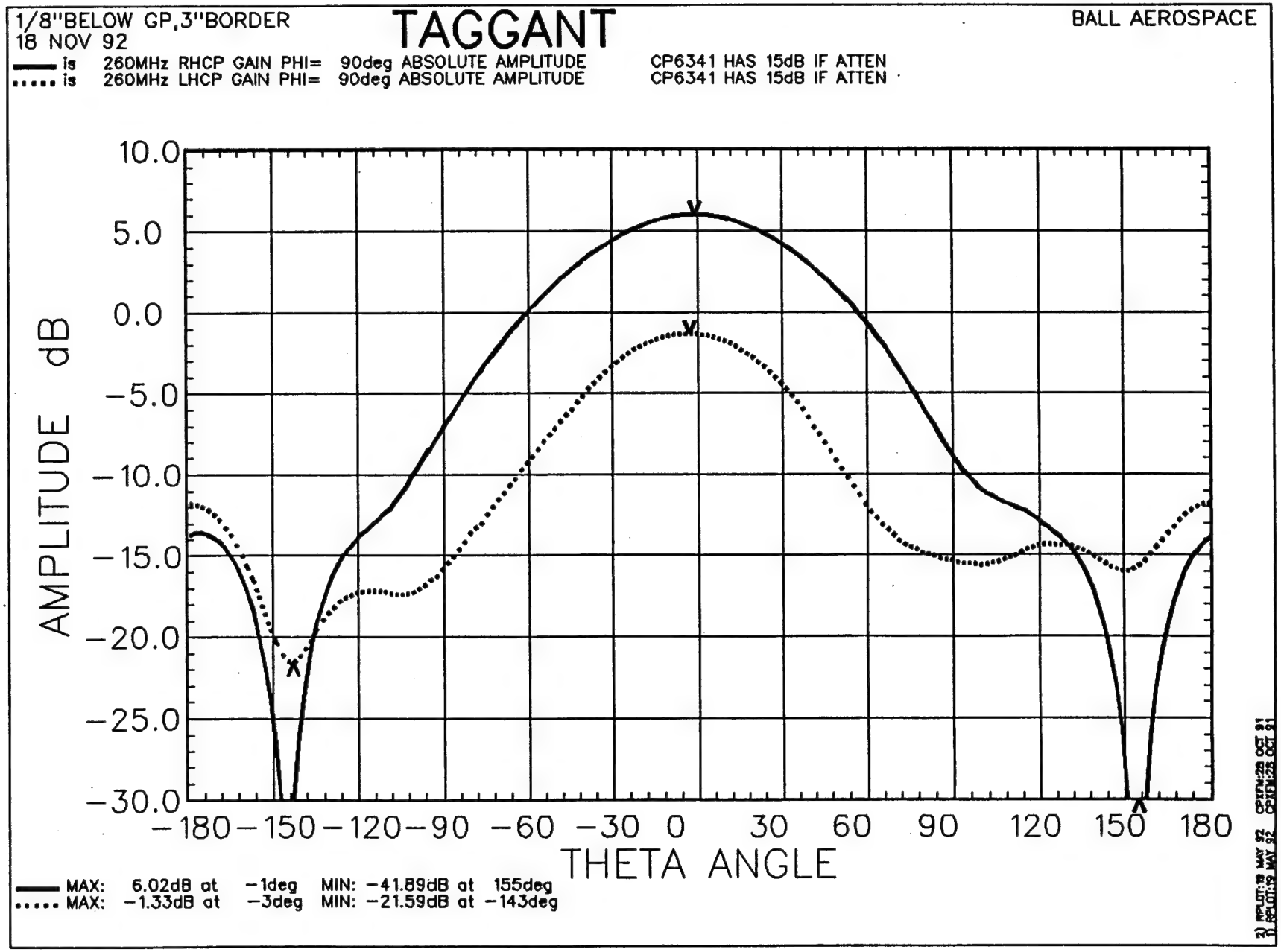
2) RPLOT:19 MAY 92 CPIN:28 OCT 91
1) RPLOT:19 MAY 92 CPIN:28 OCT 91

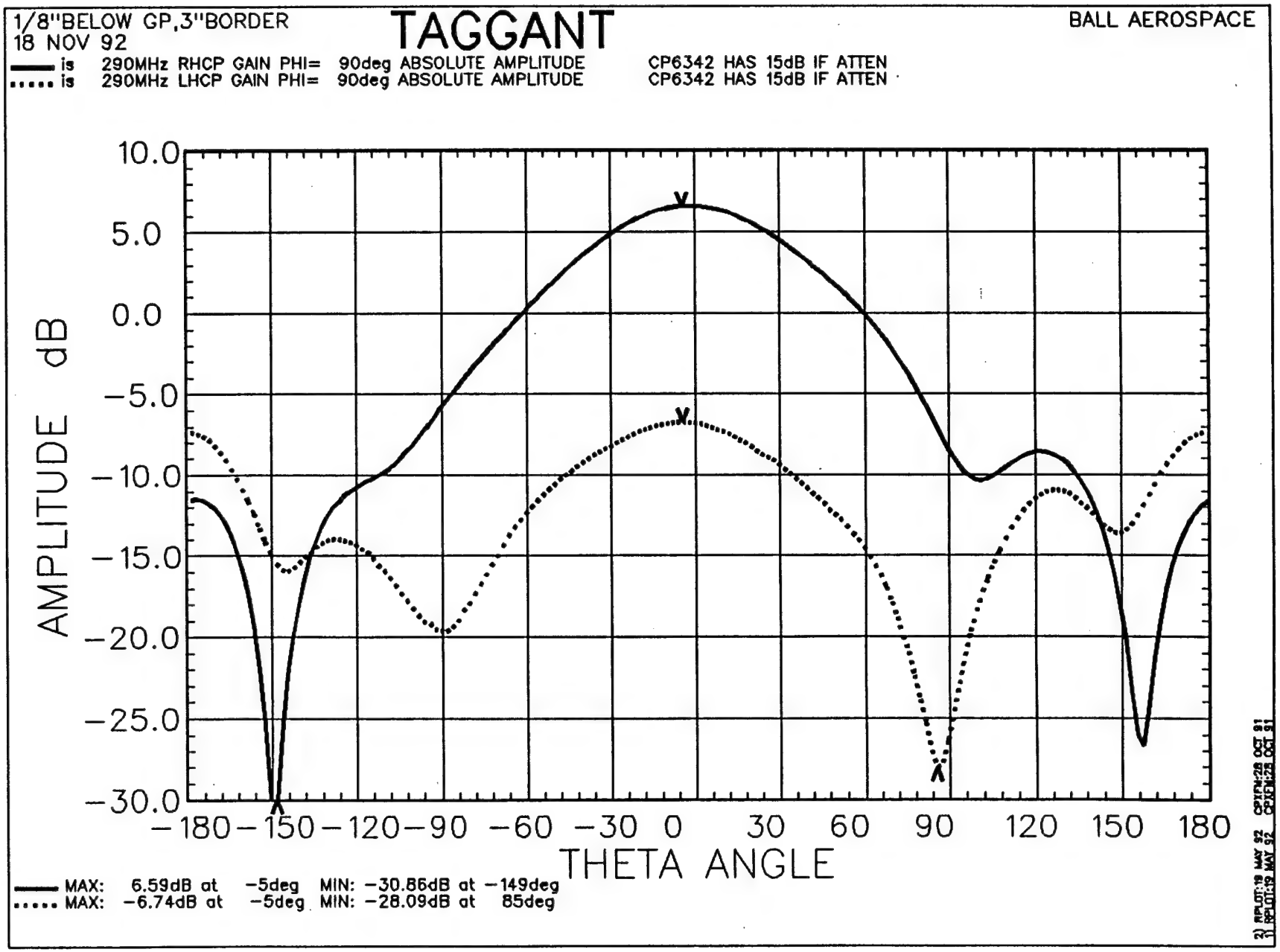

1/8"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6303 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6303 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.12dB at 2deg MIN: -36.86dB at -156deg
MAX: -4.54dB at 176deg MIN: -21.78dB at -90deg

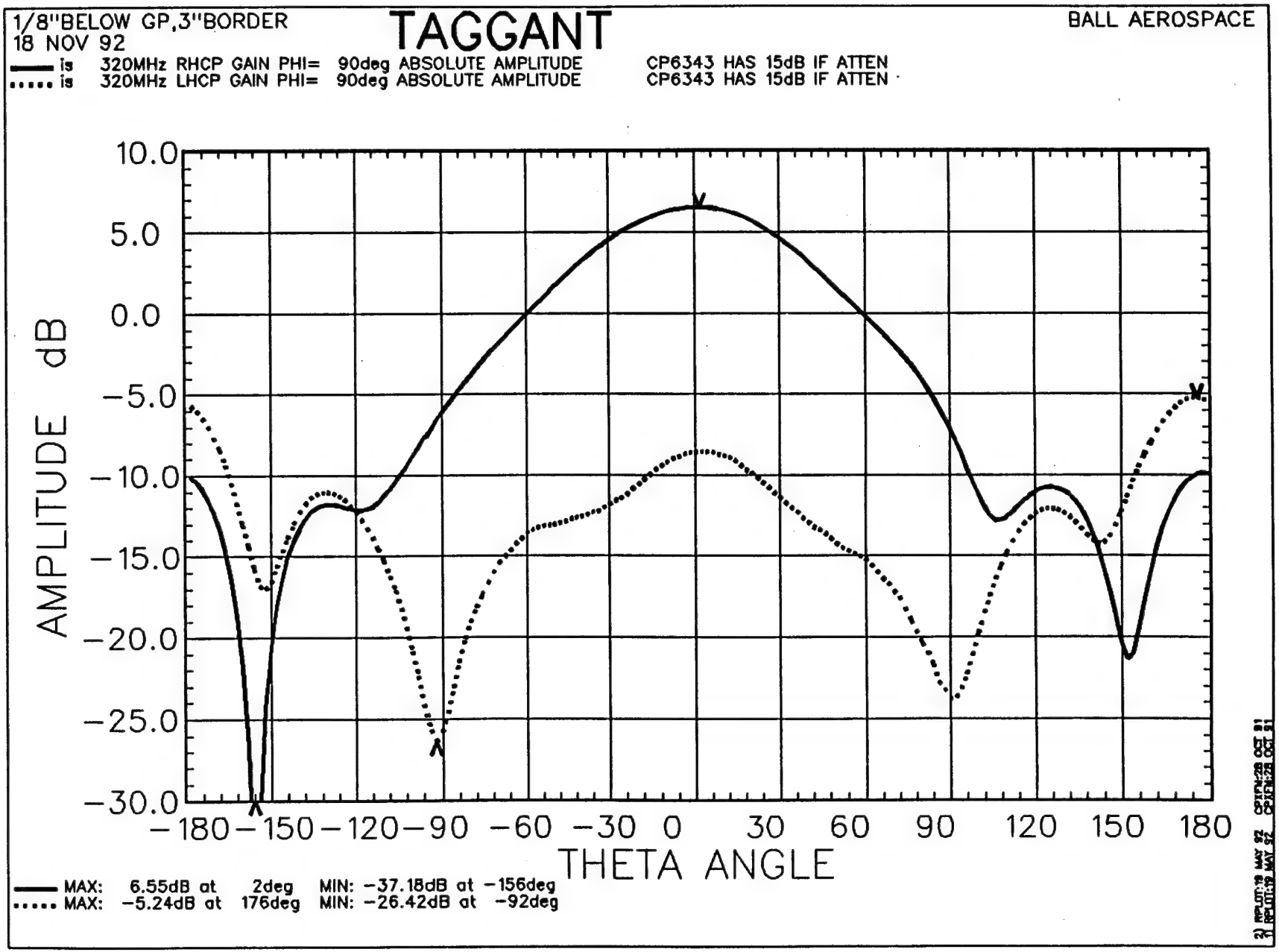

1/8"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6321 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6321 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.84dB at 1deg MIN: -16.93dB at 145deg
MAX: -1.69dB at 5deg MIN: -40.04dB at 137deg

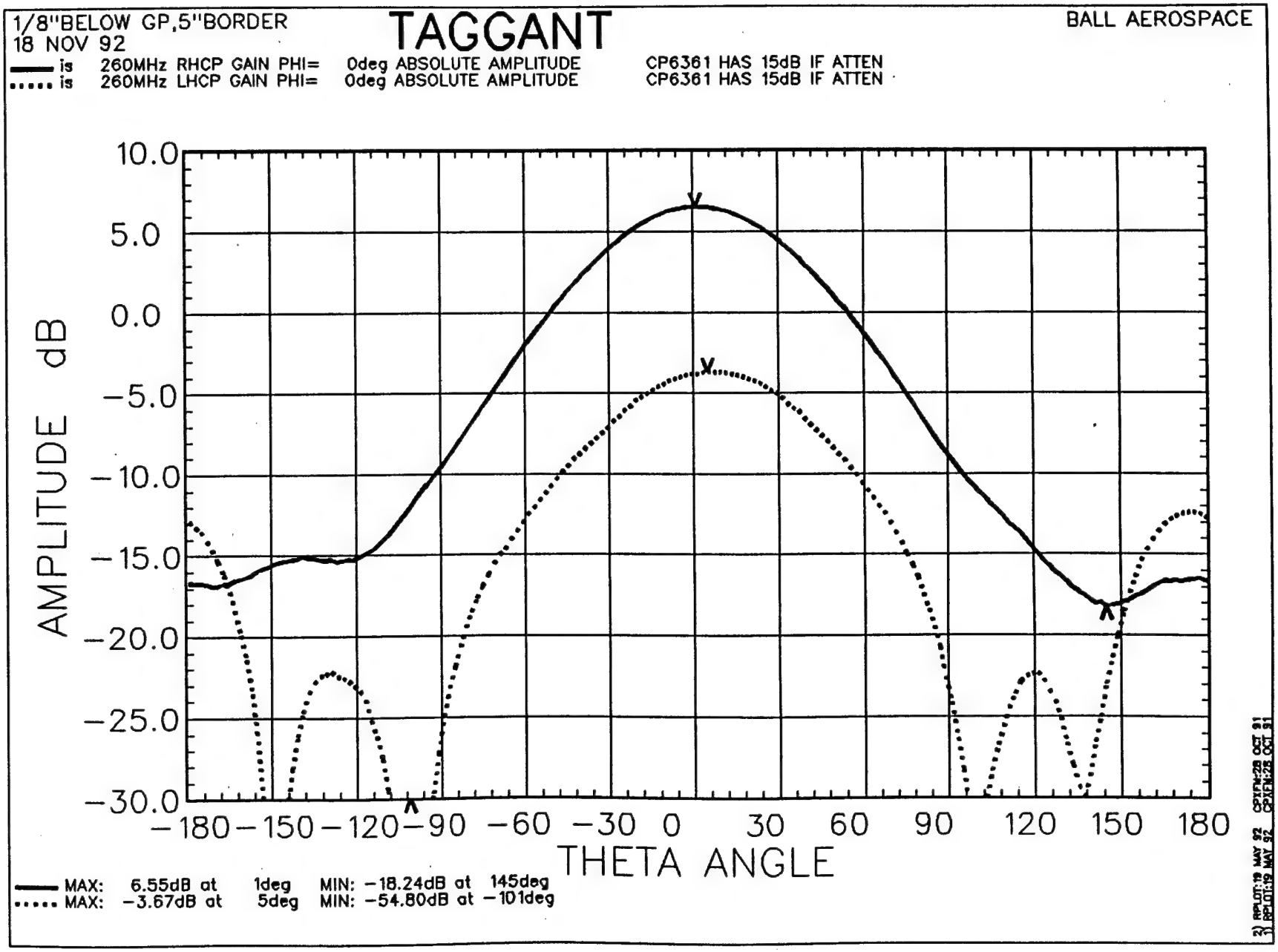

1/8"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6322 HAS 15dB IF ATTEN
is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6322 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.54dB at -1deg MIN: -16.43dB at 131deg
MAX: -7.10dB at 177deg MIN: -27.19dB at -141deg


1/8"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6323 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6323 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.61dB at 0deg MIN: -14.75dB at 154deg
MAX: -5.87dB at 178deg MIN: -20.44dB at 142deg


1/8"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6341 HAS 15dB IF ATTEN
CP6341 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.02dB at -1deg MIN: -41.89dB at 155deg
MAX: -1.33dB at -3deg MIN: -21.59dB at -143deg


1/8"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6342 HAS 15dB IF ATTEN
is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6342 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.59dB at -5deg MIN: -30.86dB at -149deg
MAX: -6.74dB at -5deg MIN: -28.09dB at 85deg


1/8"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6343 HAS 15dB IF ATTEN
CP6343 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.55dB at 2deg MIN: -37.18dB at -156deg
MAX: -5.24dB at 176deg MIN: -26.42dB at -92deg

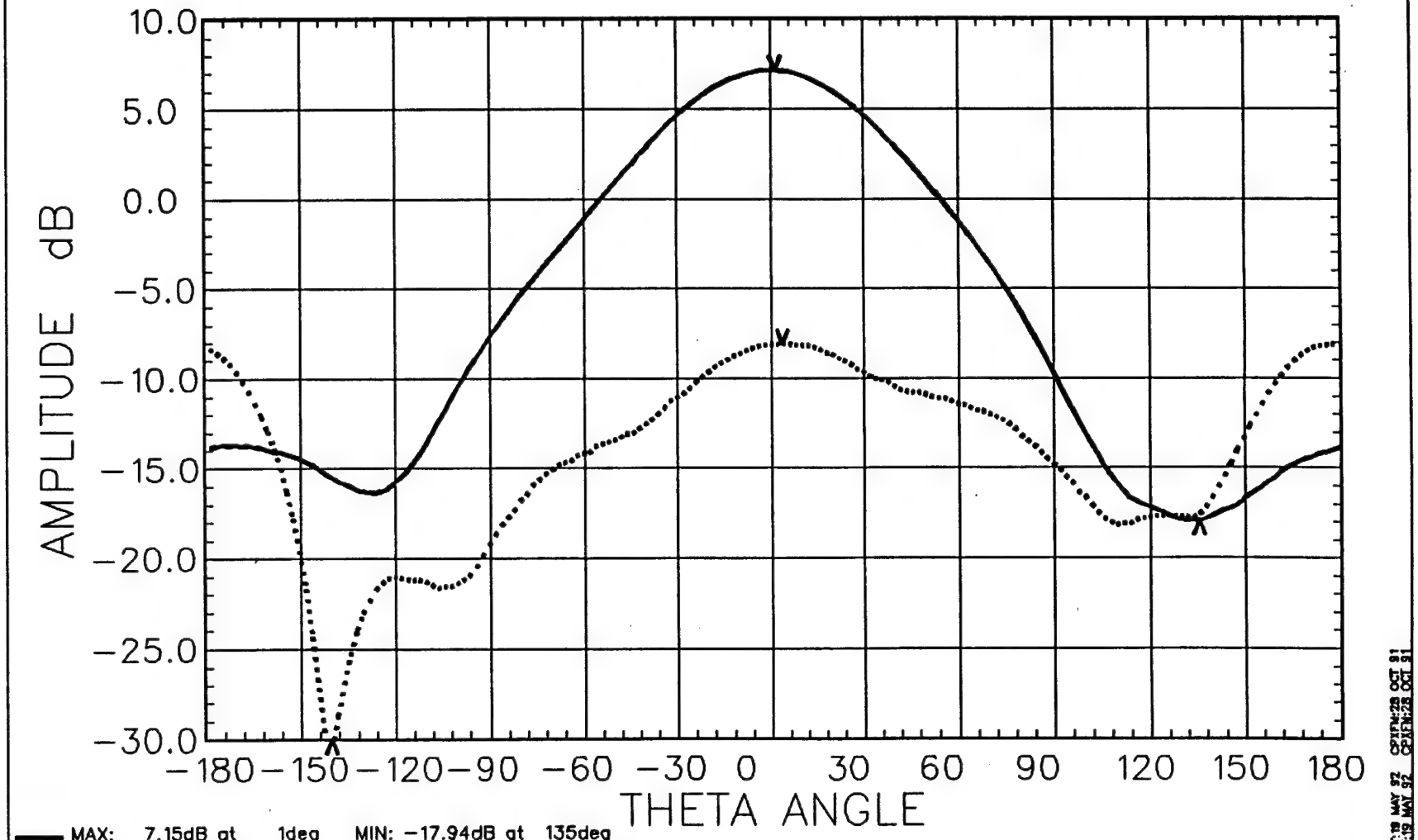

1/8"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6361 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6361 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.55dB at 1deg MIN: -18.24dB at 145deg
MAX: -3.67dB at 5deg MIN: -54.80dB at -101deg
2) RPLOT:19 MAY 92 OPTEN:28 OCT 91
1) RPLOT:19 MAY 92 OPTEN:28 OCT 91

1/8"BELOW GP,5"BORDER
18 NOV 92

TAGGANT

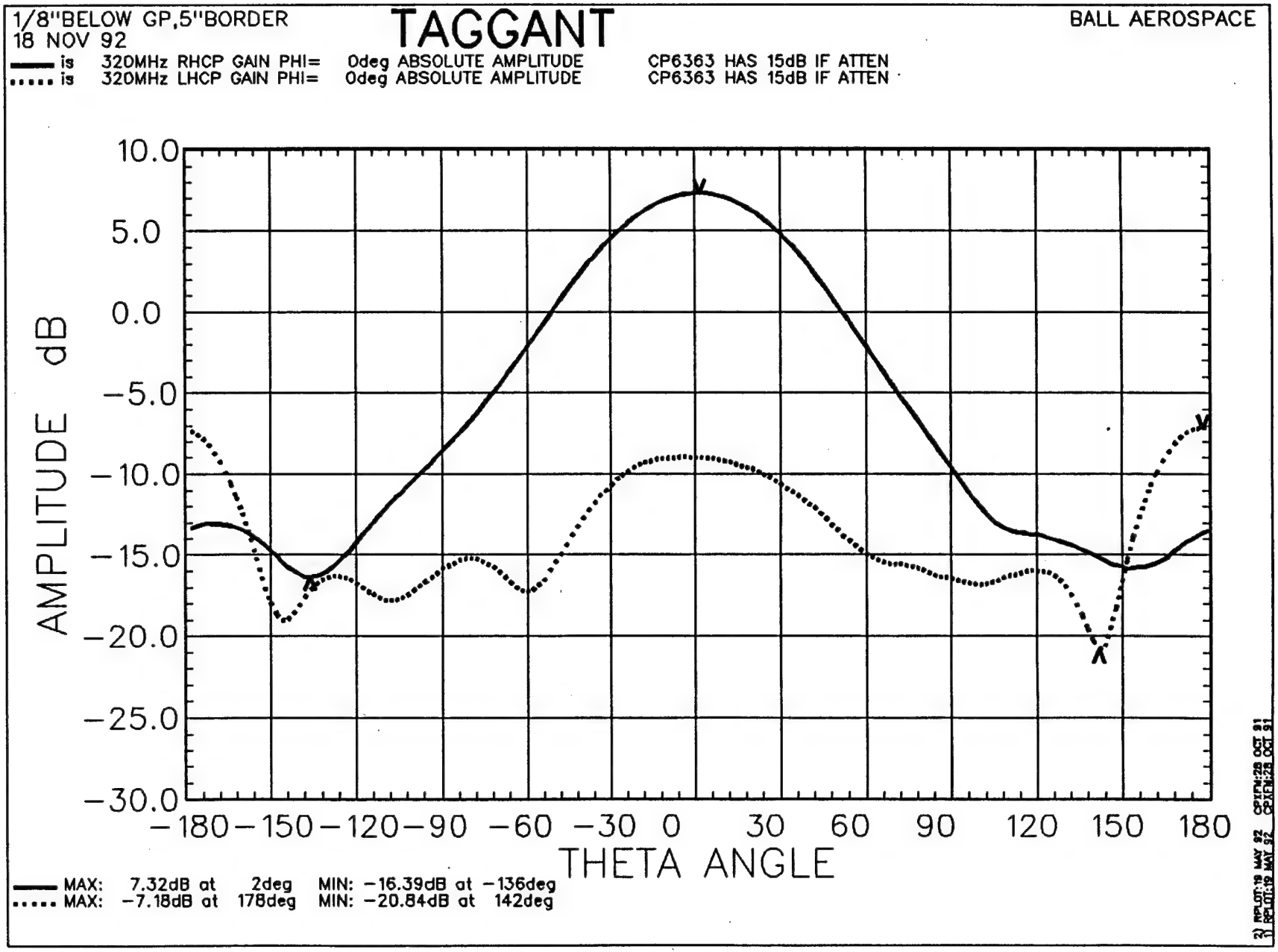
BALL AEROSPACE

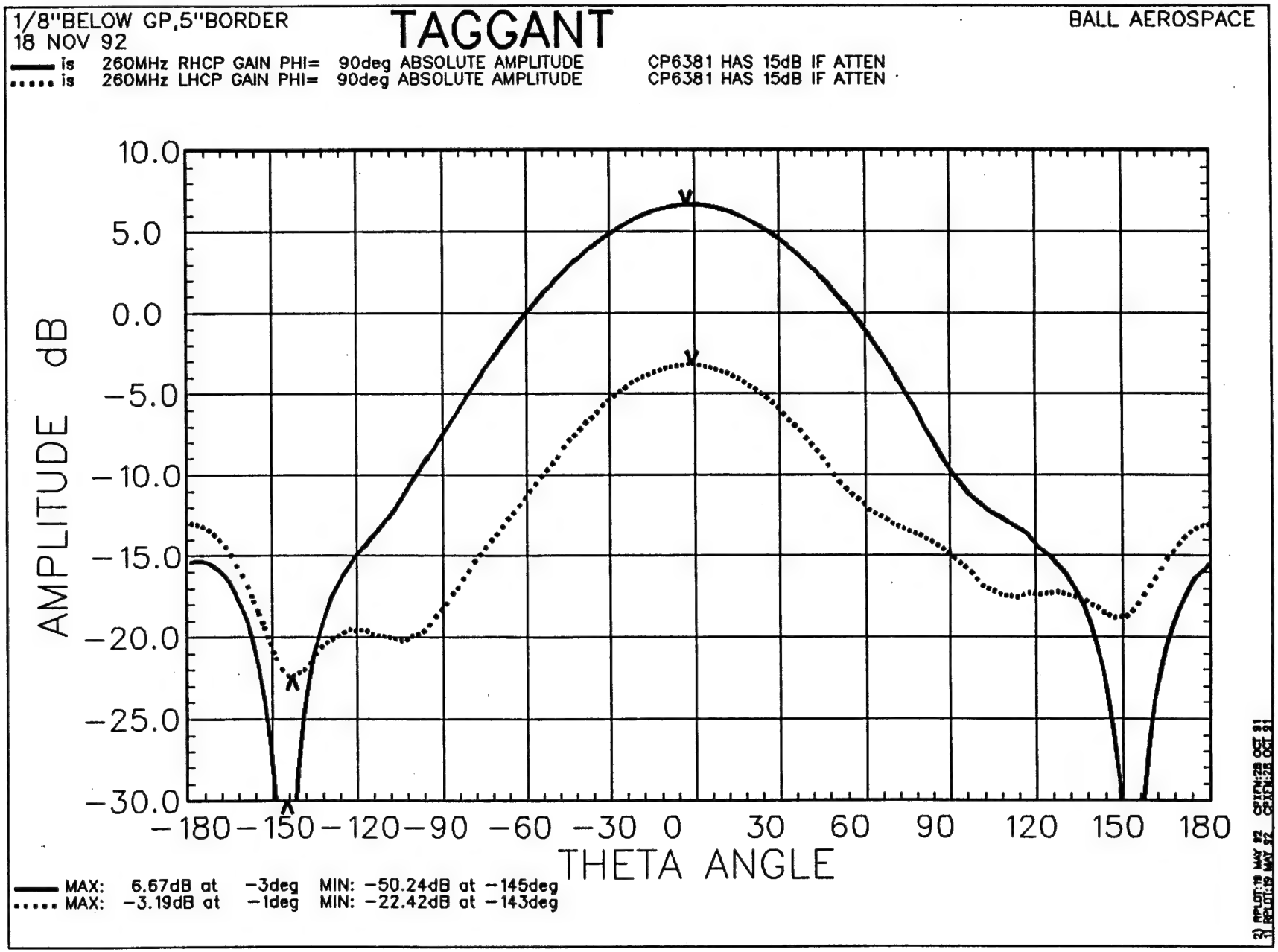
—— is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6362 HAS 15dB IF ATTEN
····· is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6362 HAS 15dB IF ATTEN



—— MAX: 7.15dB at 1deg MIN: −17.94dB at 135deg
····· MAX: −8.09dB at 3deg MIN: −30.60dB at −141deg

2) RPLOT:19 MAY 92 CP2X1=28 OCT 91
1) RPLOT:19 MAY 92 CP2X1=28 OCT 91


1/8"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6363 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6363 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.32dB at 2deg MIN: -16.39dB at -136deg
MAX: -7.18dB at 178deg MIN: -20.84dB at 142deg

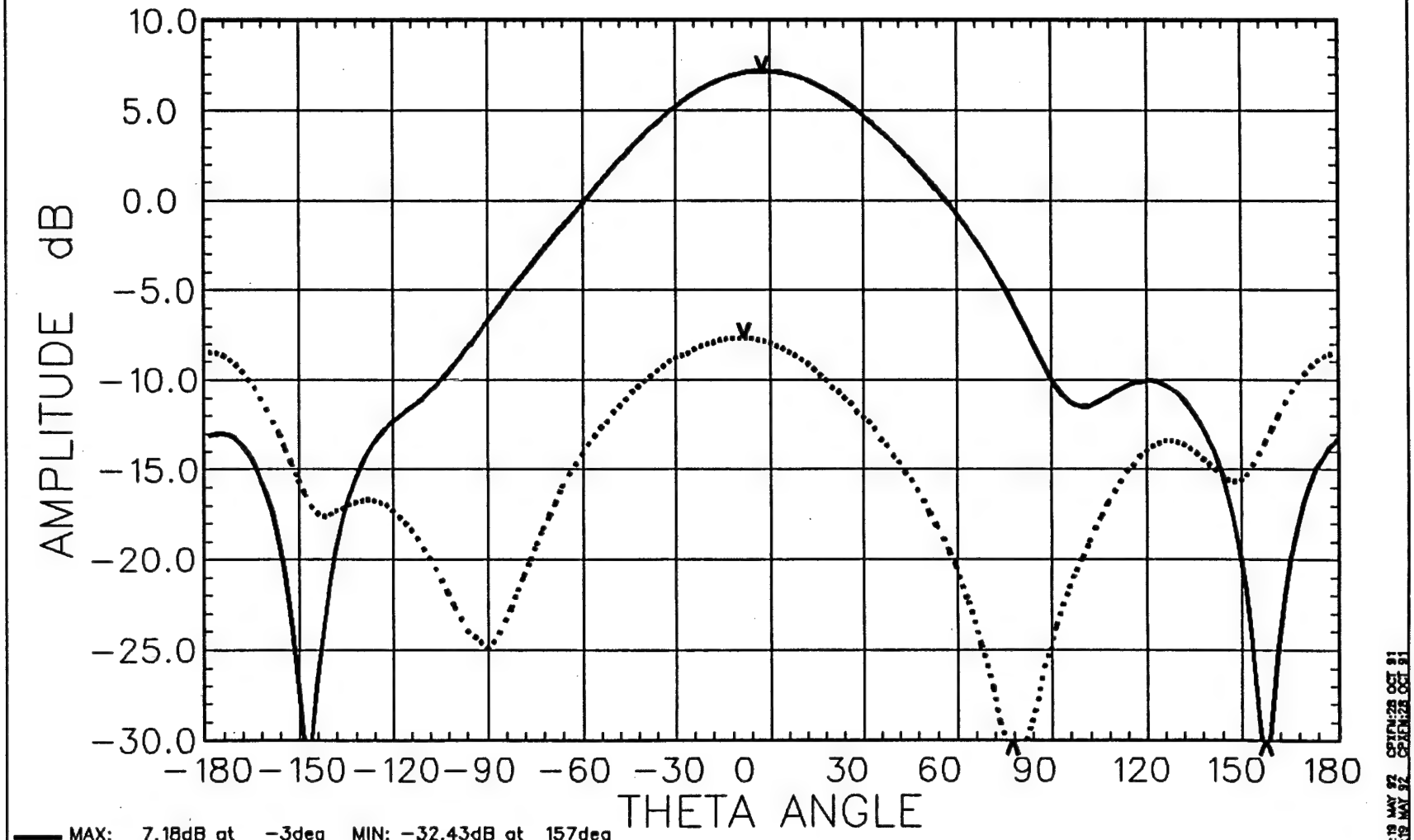

1/8"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6381 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6381 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.67dB at -3deg MIN: -50.24dB at -145deg
MAX: -3.19dB at -1deg MIN: -22.42dB at -143deg

1/8"BELOW GP,5"BORDER
18 NOV 92

TAGGANT

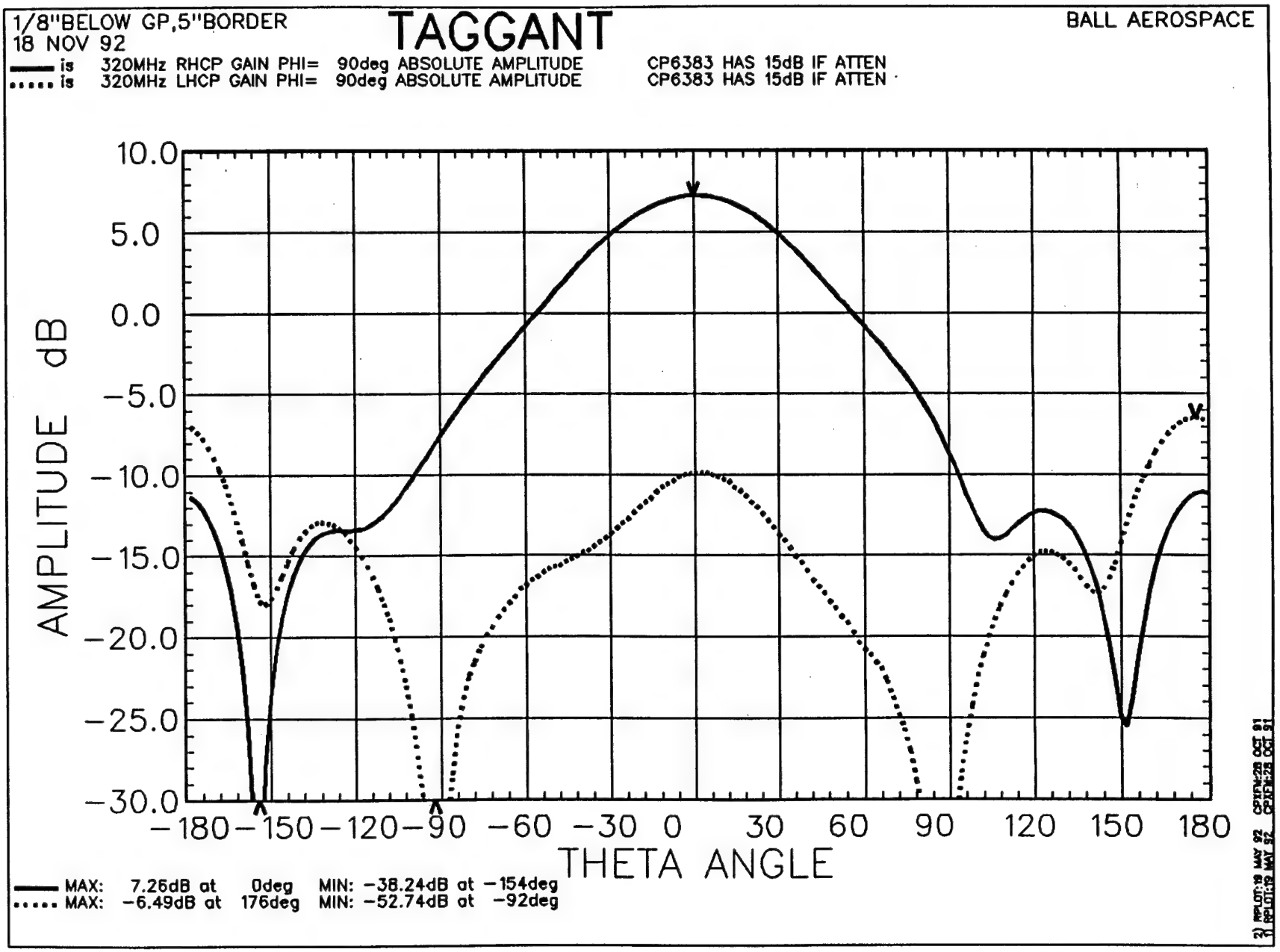
BALL AEROSPACE

—— is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6382 HAS 15dB IF ATTEN
····· is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6382 HAS 15dB IF ATTEN



—— MAX: 7.18dB at −3deg MIN: −32.43dB at 157deg
····· MAX: −7.67dB at −9deg MIN: −31.06dB at 77deg

2) RPLOT:19 MAY 92 CPIN:28 OCT 91
1) RPLOT:19 MAY 92 CPIN:28 OCT 91

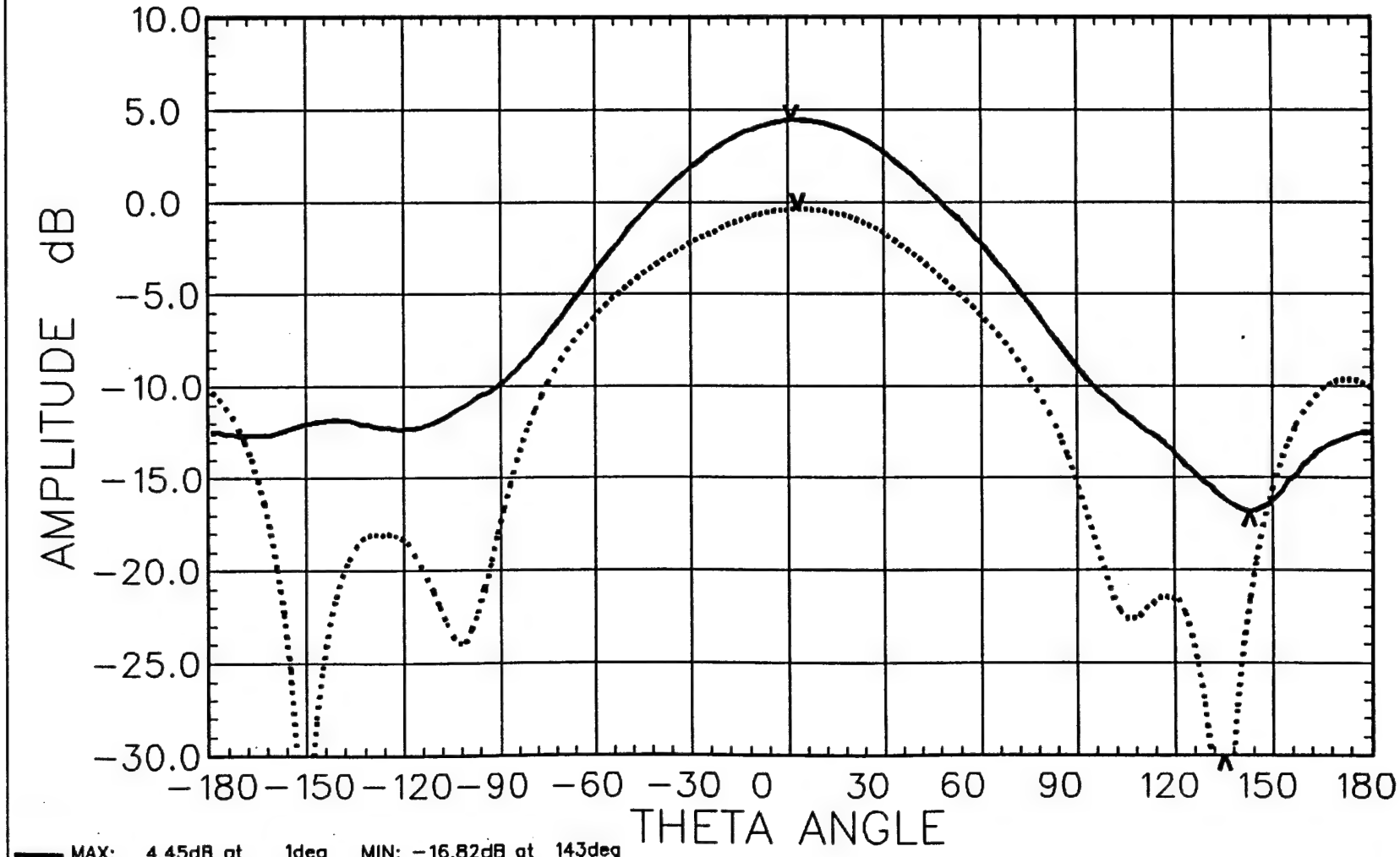

1/8"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6383 HAS 15dB IF ATTEN
CP6383 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.26dB at 0deg MIN: -38.24dB at -154deg
MAX: -6.49dB at 176deg MIN: -52.74dB at -92deg

1/2"BELOW GP,1"BORDER
18 NOV 92

TAGGANT

BALL AEROSPACE

—— is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6401 HAS 15dB IF ATTEN
····· is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6401 HAS 15dB IF ATTEN



—— MAX: 4.45dB at 1deg MIN: -16.82dB at 143deg
····· MAX: -.37dB at 3deg MIN: -39.96dB at 135deg

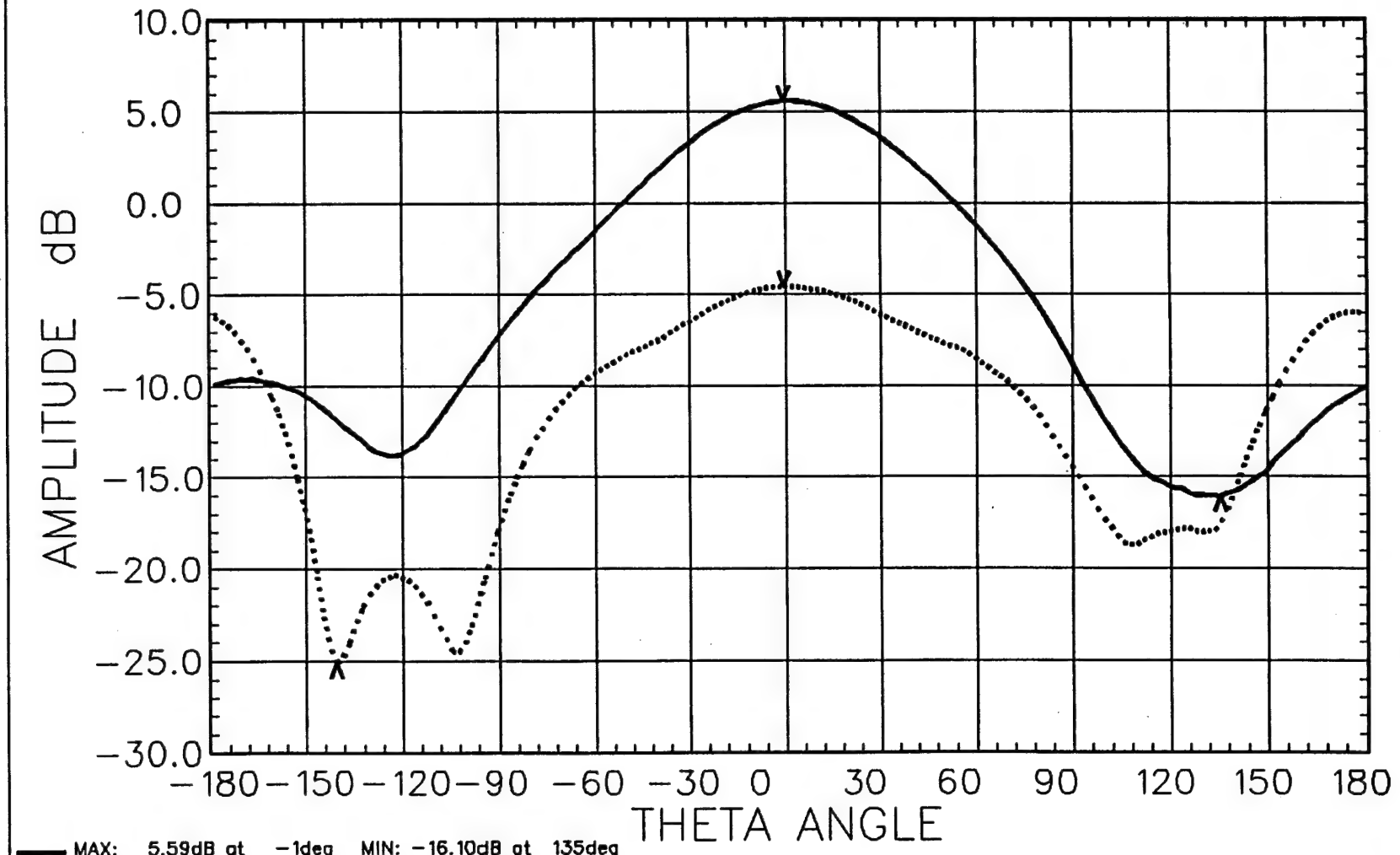
2) RPLOT:19 MAY 92 CPXFN:28 OCT 91
1) RPLOT:19 MAY 92 CPXFN:28 OCT 91

1/2"BELOW GP,1"BORDER
18 NOV 92

TAGGANT

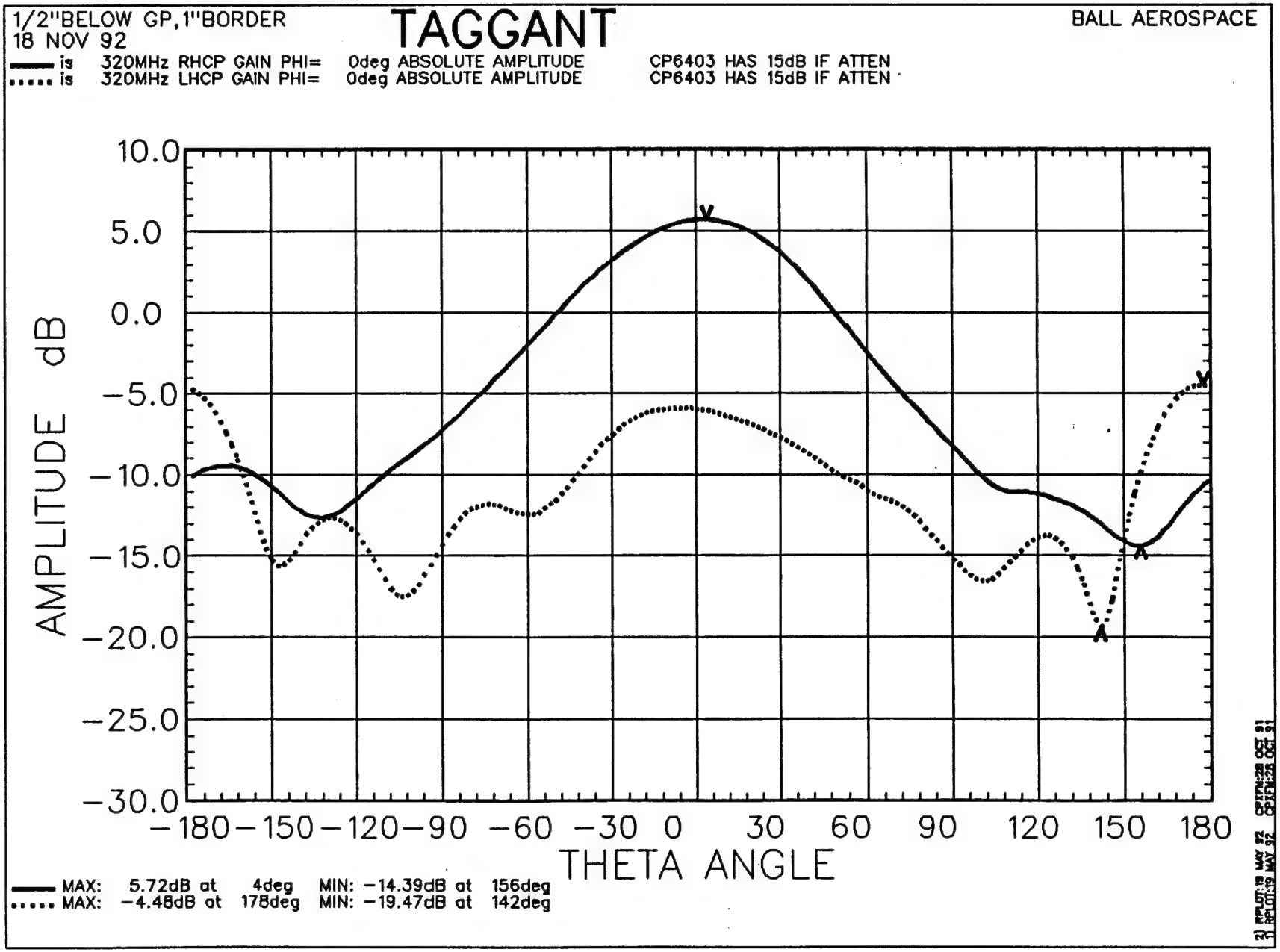
BALL AEROSPACE

—— is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6402 HAS 15dB IF ATTEN
····· is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6402 HAS 15dB IF ATTEN



—— MAX: 5.59dB at −1deg MIN: −16.10dB at 135deg
····· MAX: −4.56dB at −1deg MIN: −25.14dB at −141deg

2) RPLOT:19 MAY 92 CPIEM:28 OCT 91
1) RPLOT:19 MAY 92 CPIEM:28 OCT 91

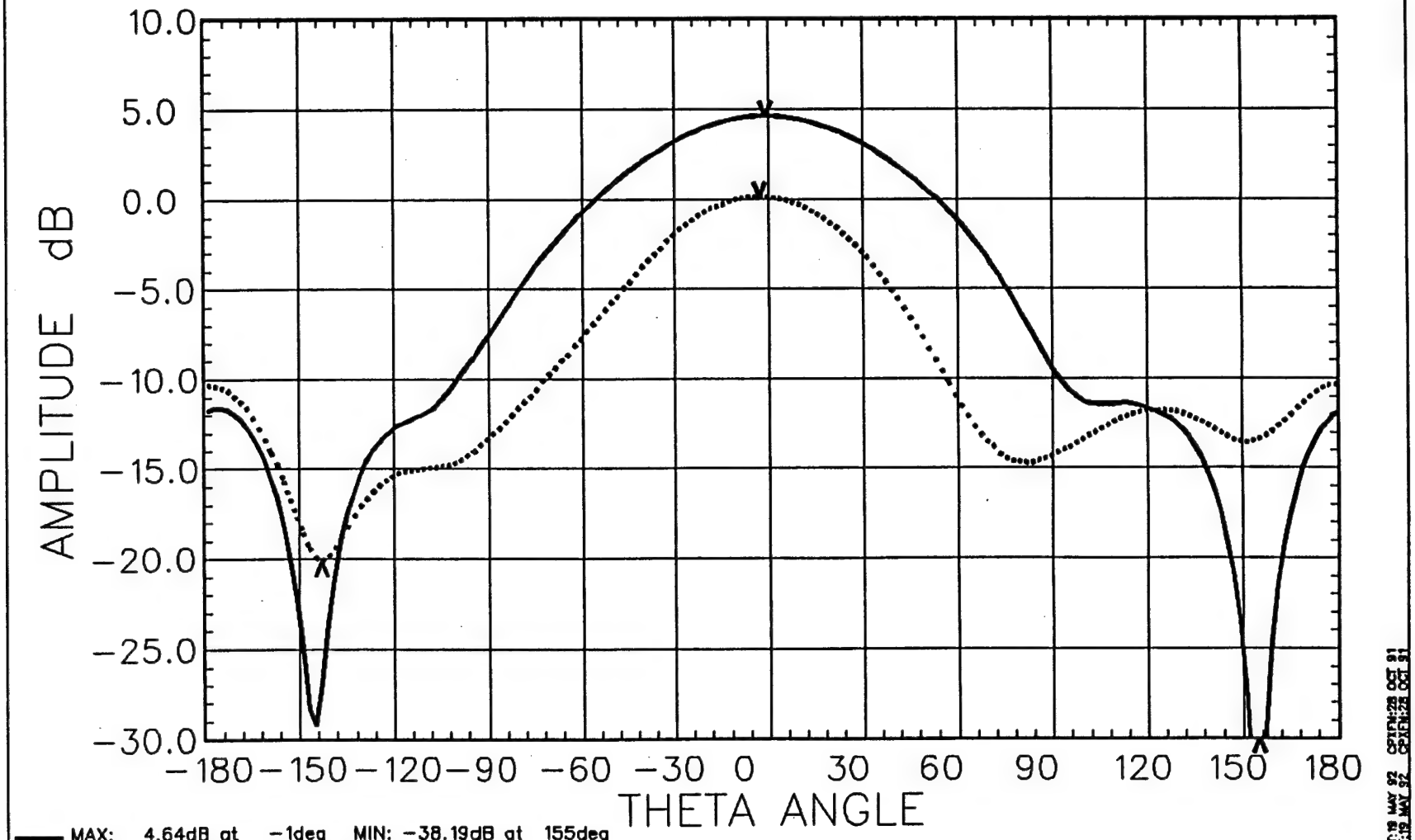

1/2"BELOW GP,1"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6403 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6403 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
−5.0
−10.0
−15.0
−20.0
−25.0
−30.0
−180 −150 −120 −90 −60 −30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.72dB at 4deg MIN: −14.39dB at 156deg
MAX: −4.48dB at 178deg MIN: −19.47dB at 142deg

1/2"BELOW GP,1"BORDER
18 NOV 92

TAGGANT

BALL AEROSPACE

—— is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6421 HAS 15dB IF ATTEN
····· is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6421 HAS 15dB IF ATTEN



—— MAX: 4.64dB at −1deg MIN: −38.19dB at 155deg
····· MAX: .12dB at −3deg MIN: −20.17dB at −143deg

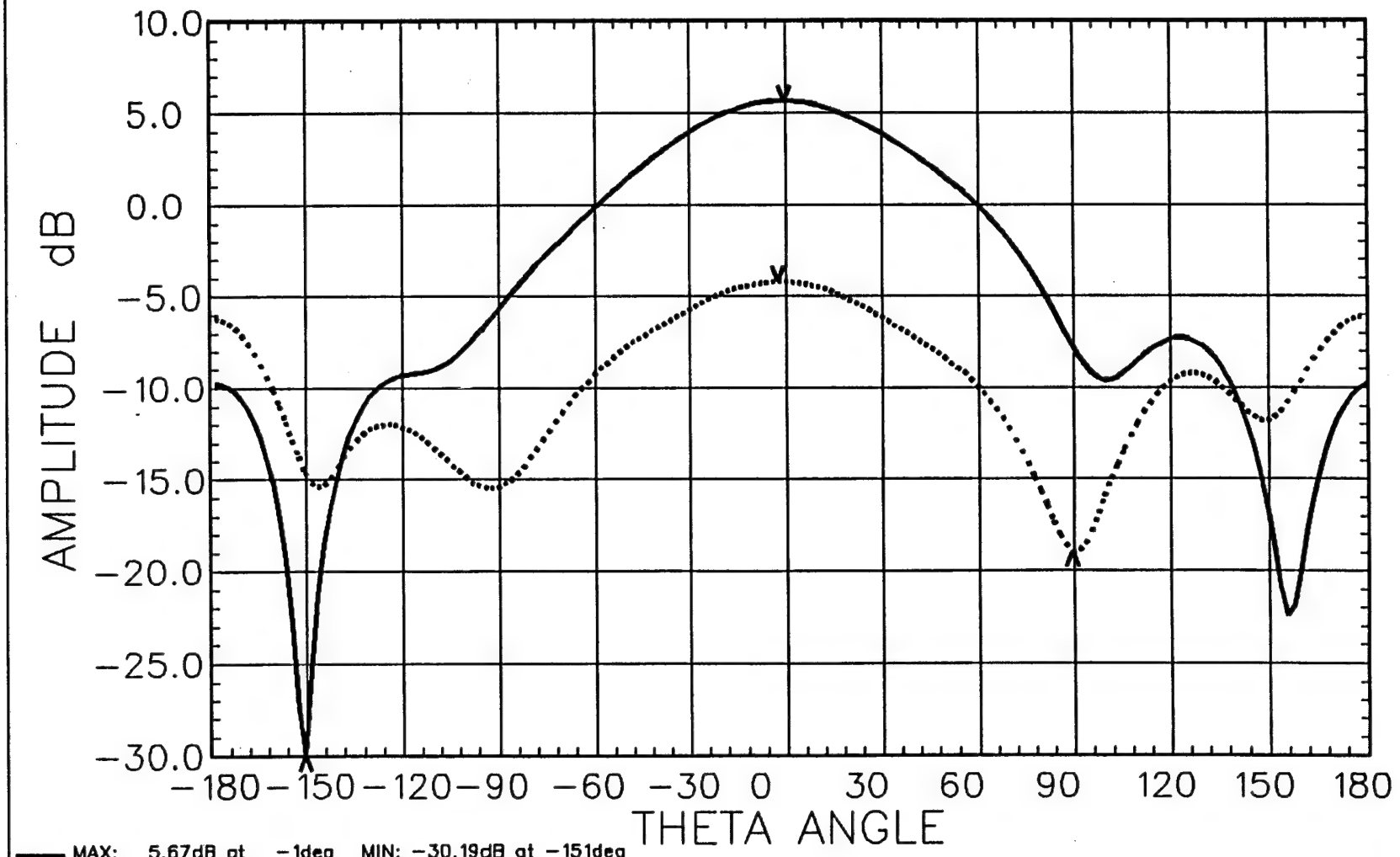
2) RPLOT:19 MAY 92 CP1FN:23 OCT 91
1) RPLOT:19 MAY 92 CP1FN:23 OCT 91

1/2"BELOW GP,1"BORDER
18 NOV 92

TAGGANT

BALL AEROSPACE

—— is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6422 HAS 15dB IF ATTEN
····· is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6422 HAS 15dB IF ATTEN



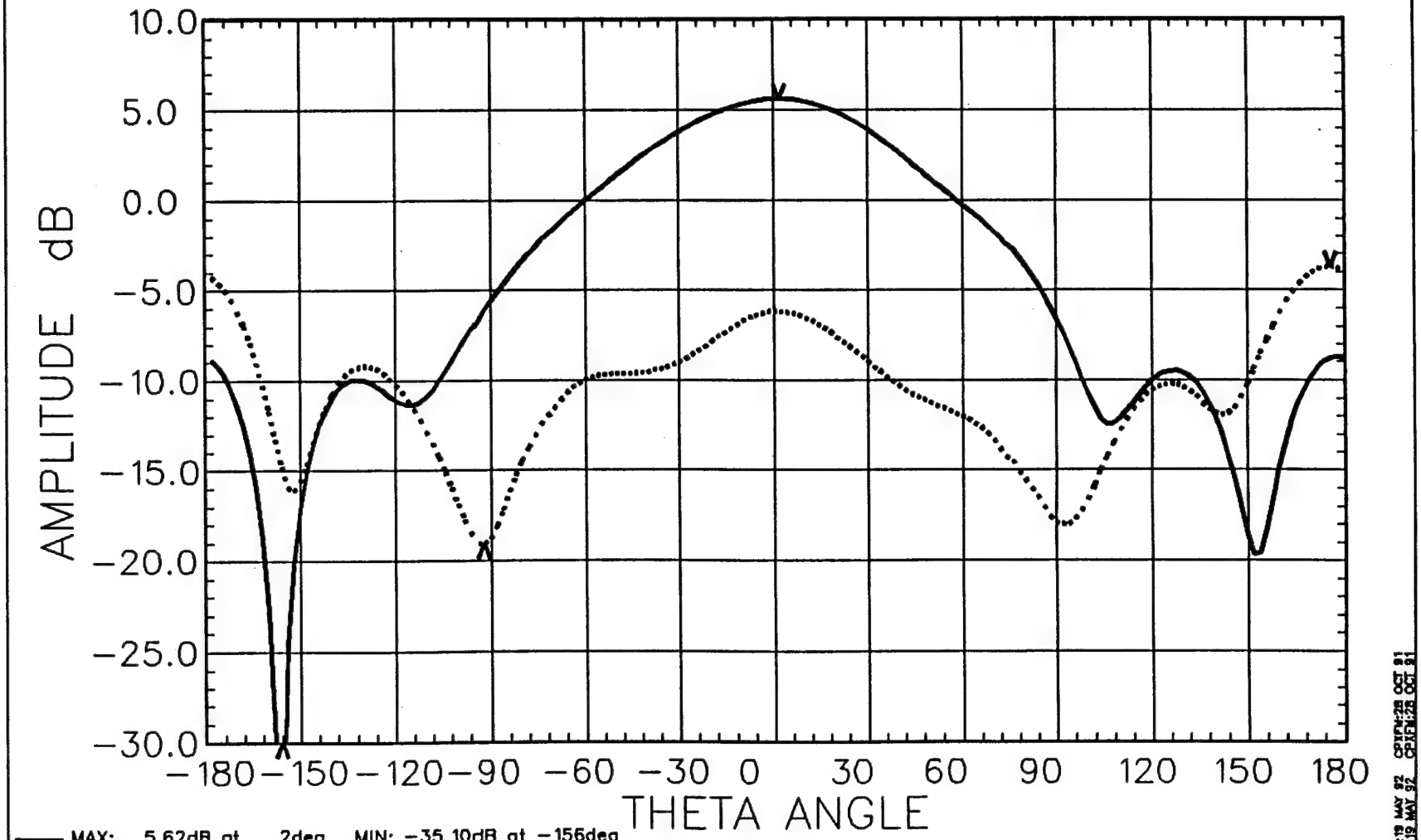
—— MAX: 5.67dB at −1deg MIN: −30.19dB at −151deg
····· MAX: −4.19dB at −3deg MIN: −18.98dB at 89deg

1/2"BELOW GP,1"BORDER
18 NOV 92

TAGGANT

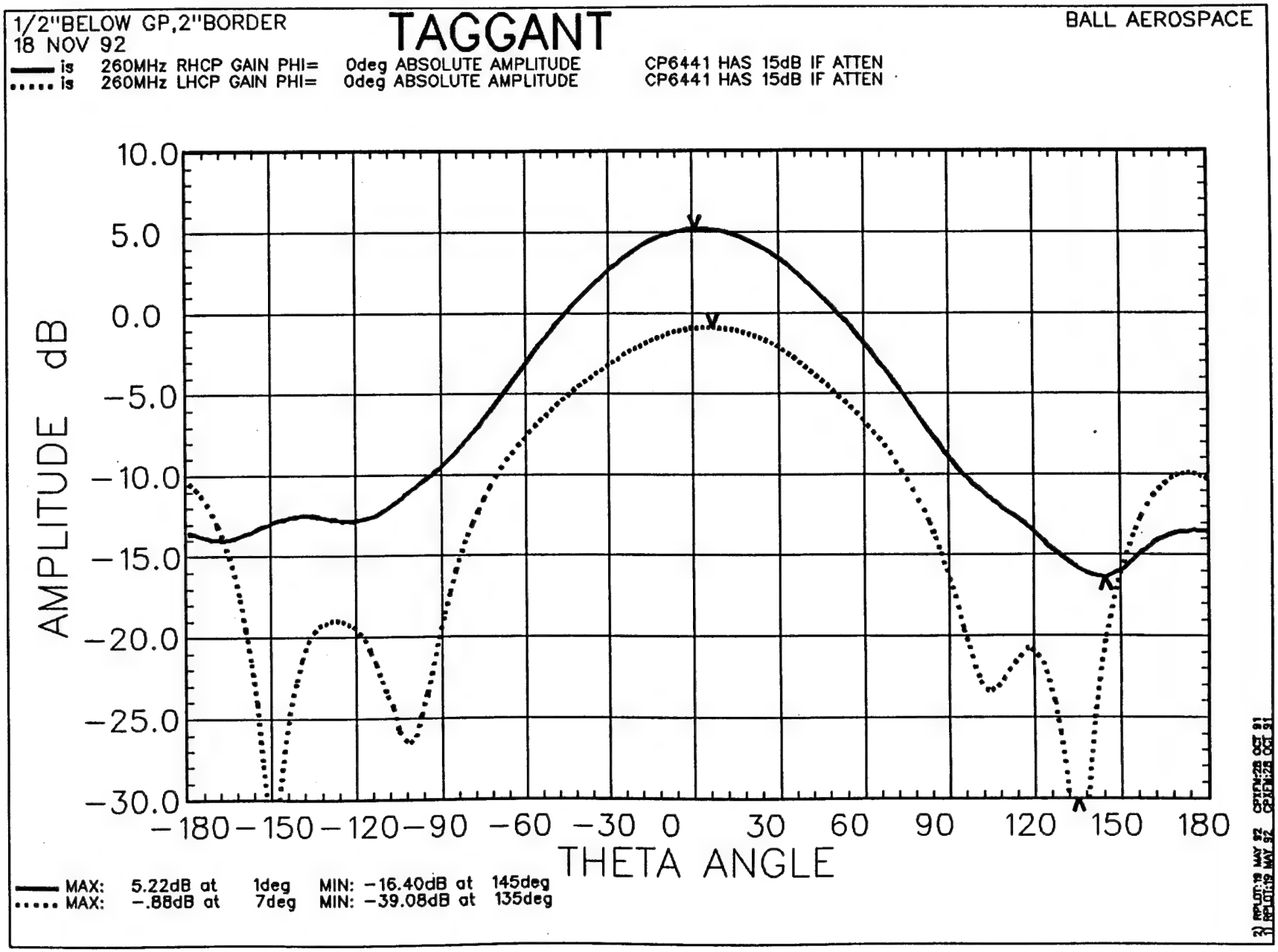
BALL AEROSPACE

—— is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6423 HAS 15dB IF ATTEN
····· is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6423 HAS 15dB IF ATTEN



—— MAX: 5.62dB at 2deg MIN: −35.10dB at −156deg
····· MAX: −3.70dB at 176deg MIN: −19.07dB at −92deg

2) RPLOT:19 MAY 92 CP1FR:28 OCT 91
1) RPLOT:19 MAY 92 CP1FR:28 OCT 91

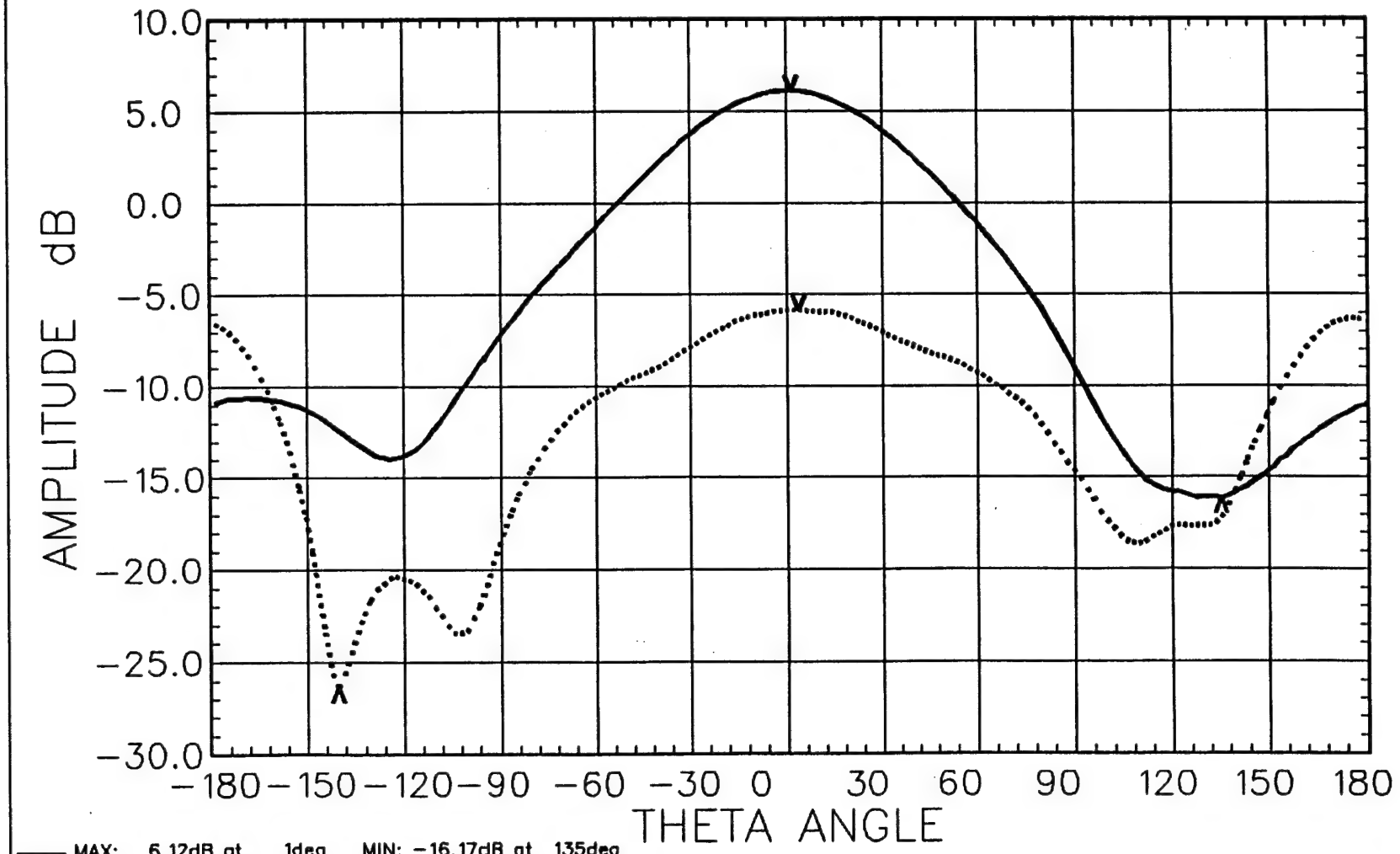

1/2"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6441 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6441 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.22dB at 1deg MIN: -16.40dB at 145deg
MAX: -.88dB at 7deg MIN: -39.08dB at 135deg

1/2"BELOW GP,2"BORDER
18 NOV 92

TAGGANT

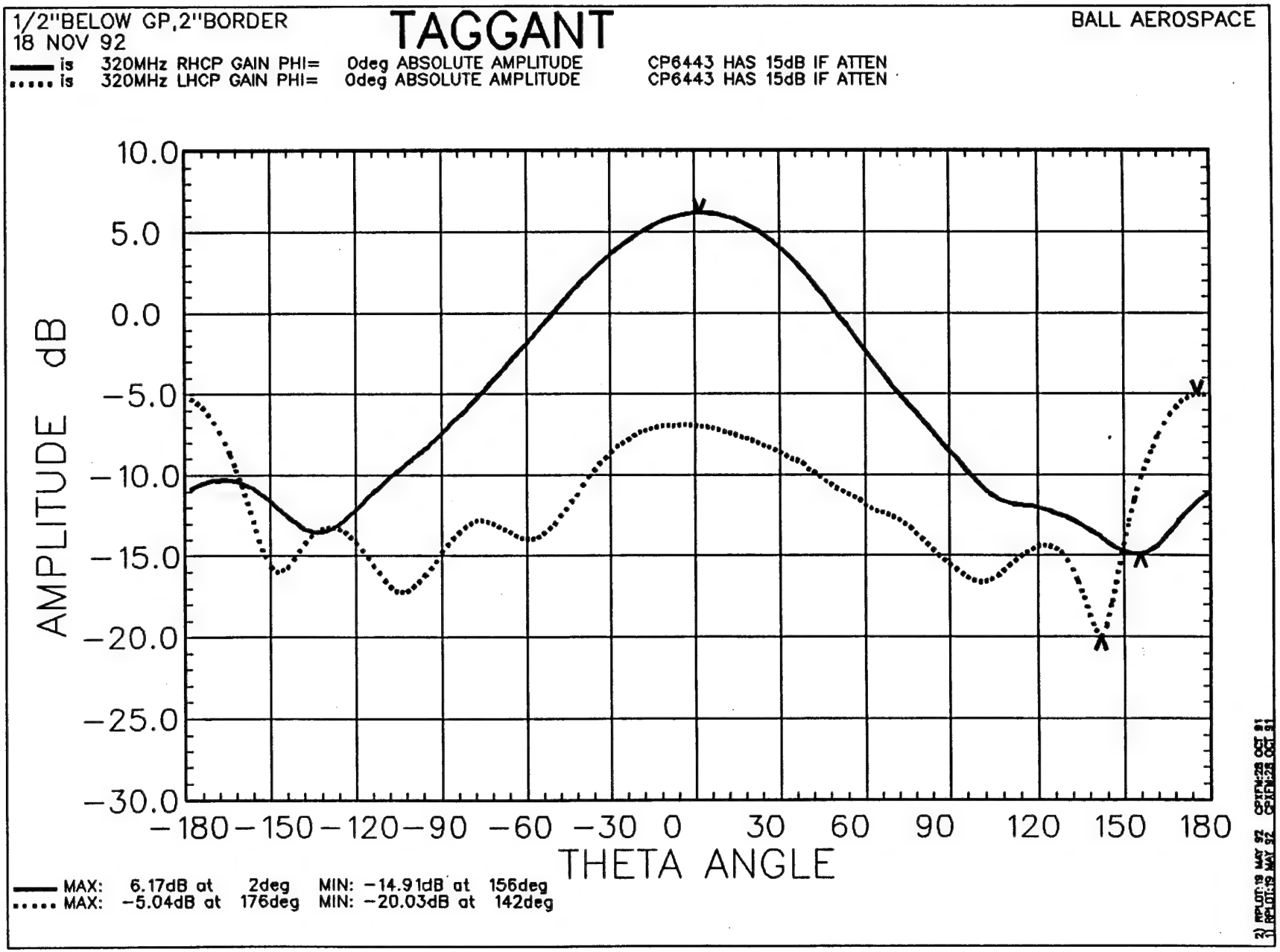
BALL AEROSPACE

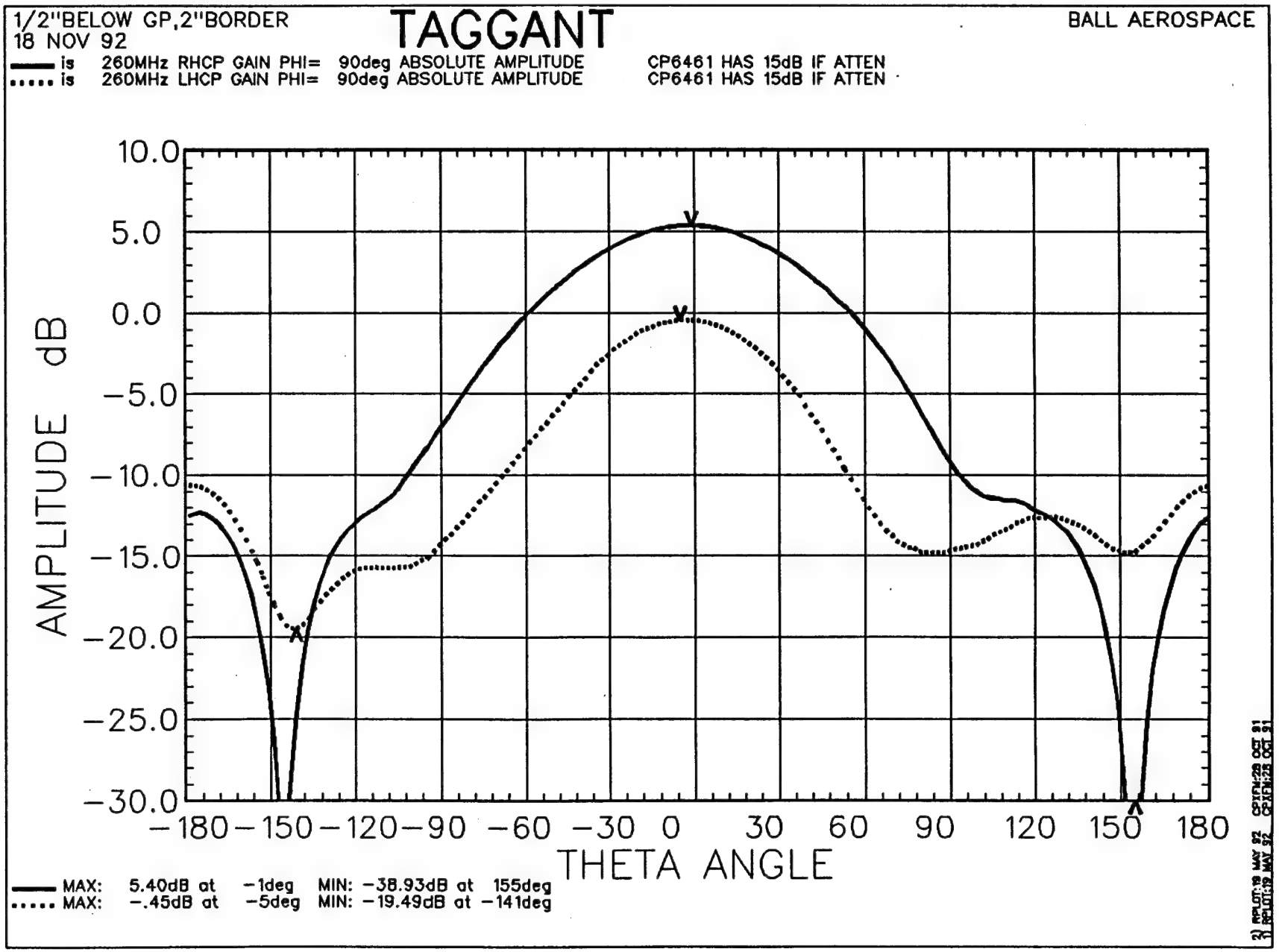
—— is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6442 HAS 15dB IF ATTEN
..... is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6442 HAS 15dB IF ATTEN

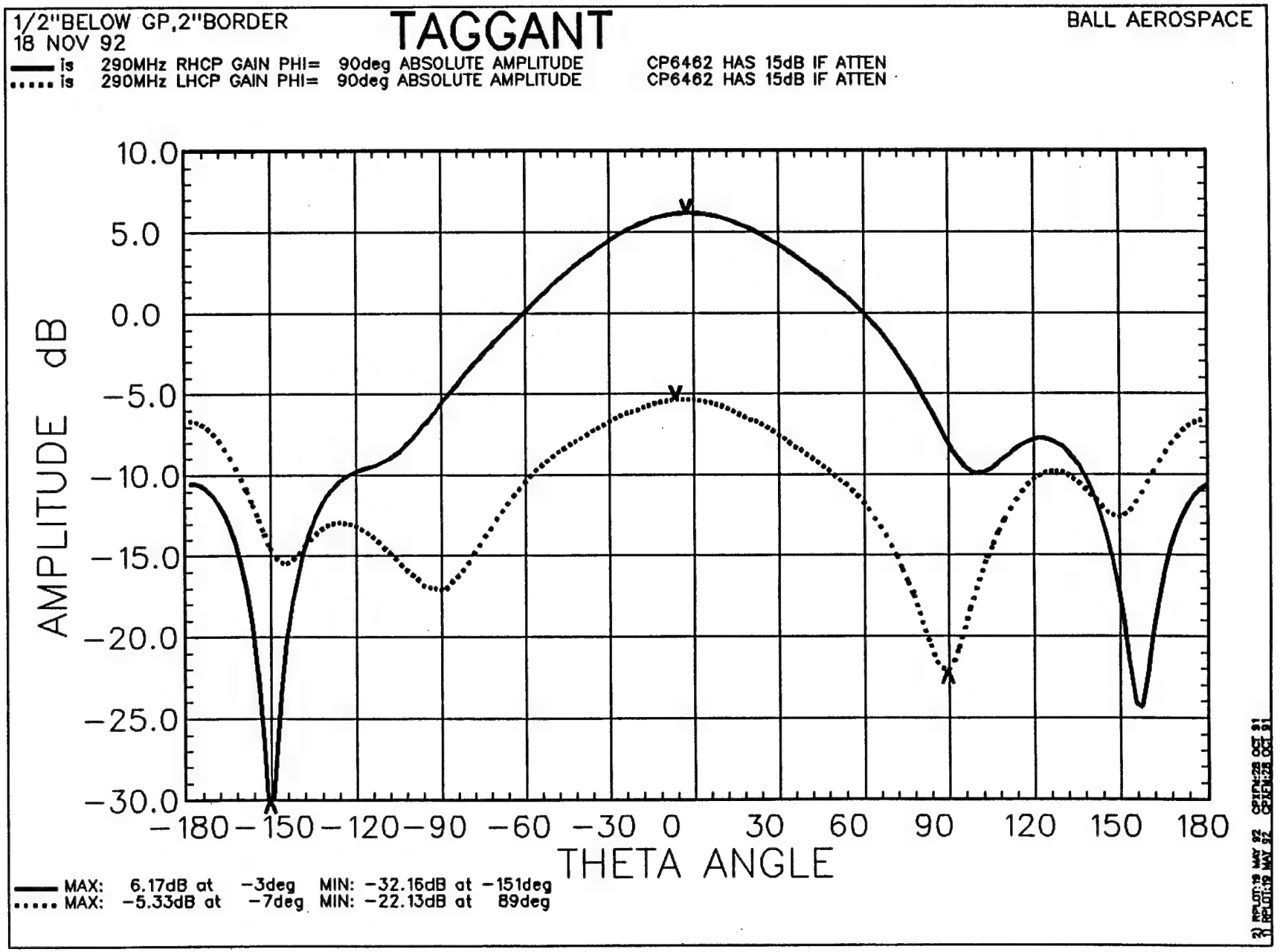


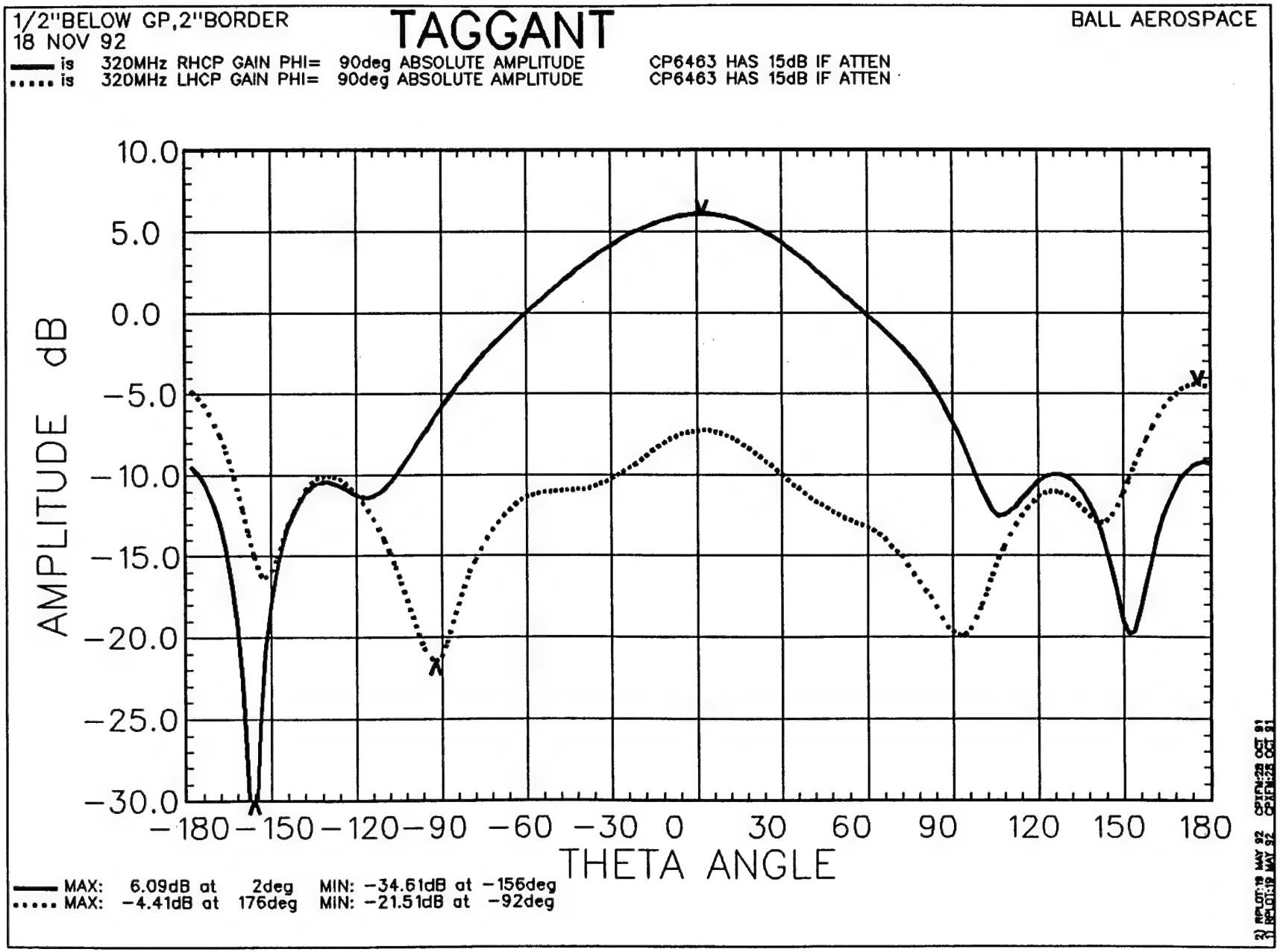
—— MAX: 6.12dB at 1deg MIN: −16.17dB at 135deg
..... MAX: −5.86dB at 3deg MIN: −26.39dB at −141deg

1) RPLOT:19 MAY 92 OPTN:28 OCT 91
2) RPLOT:19 MAY 92 OPTN:28 OCT 91


1/2"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6443 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6443 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.17dB at 2deg MIN: -14.91dB at 156deg
MAX: -5.04dB at 176deg MIN: -20.03dB at 142deg


1/2"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6461 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6461 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.40dB at -1deg MIN: -38.93dB at 155deg
MAX: -.45dB at -5deg MIN: -19.49dB at -141deg
2) RPLOT:19 MAY 92 CP2EM:28 OCT 91
1) RPLOT:19 MAY 92 CP2EM:28 OCT 91


1/2"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6462 HAS 15dB IF ATTEN
CP6462 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.17dB at -3deg MIN: -32.16dB at -151deg
MAX: -5.33dB at -7deg MIN: -22.13dB at 89deg

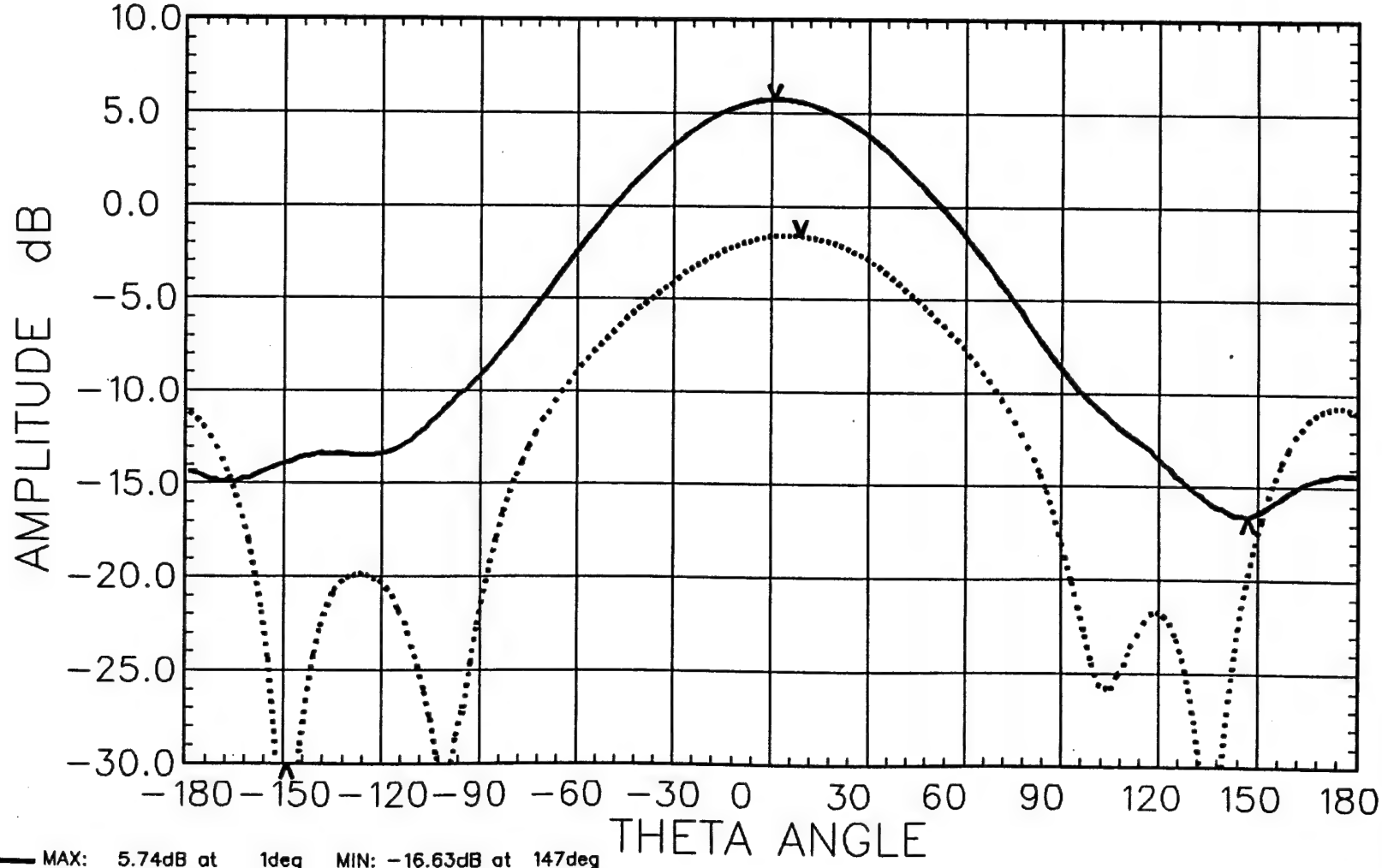

1/2"BELOW GP,2"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6463 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6463 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.09dB at 2deg MIN: -34.61dB at -156deg
MAX: -4.41dB at 176deg MIN: -21.51dB at -92deg

1/2"BELOW GP,3"BORDER
18 NOV 92

TAGGANT

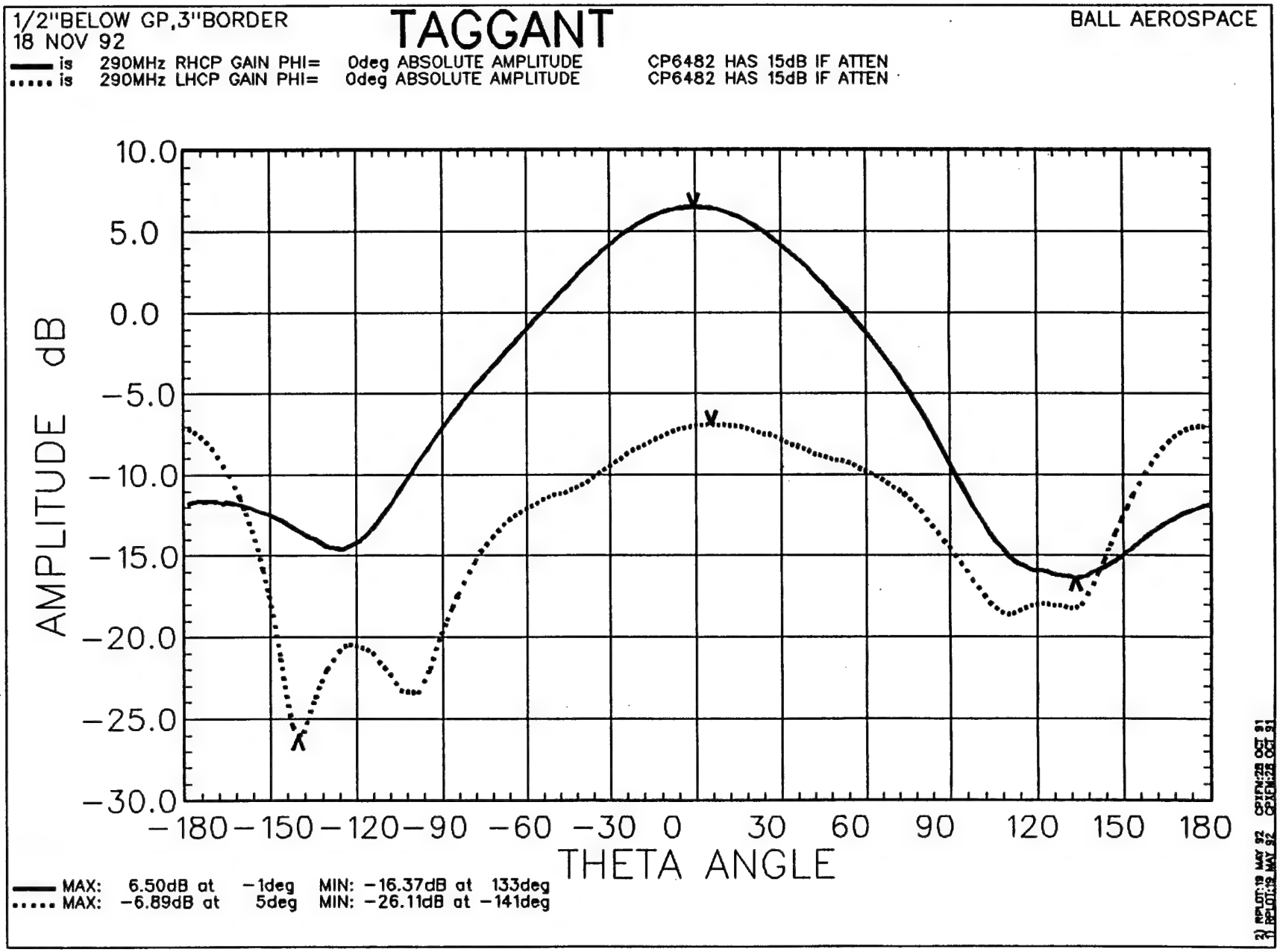
BALL AEROSPACE

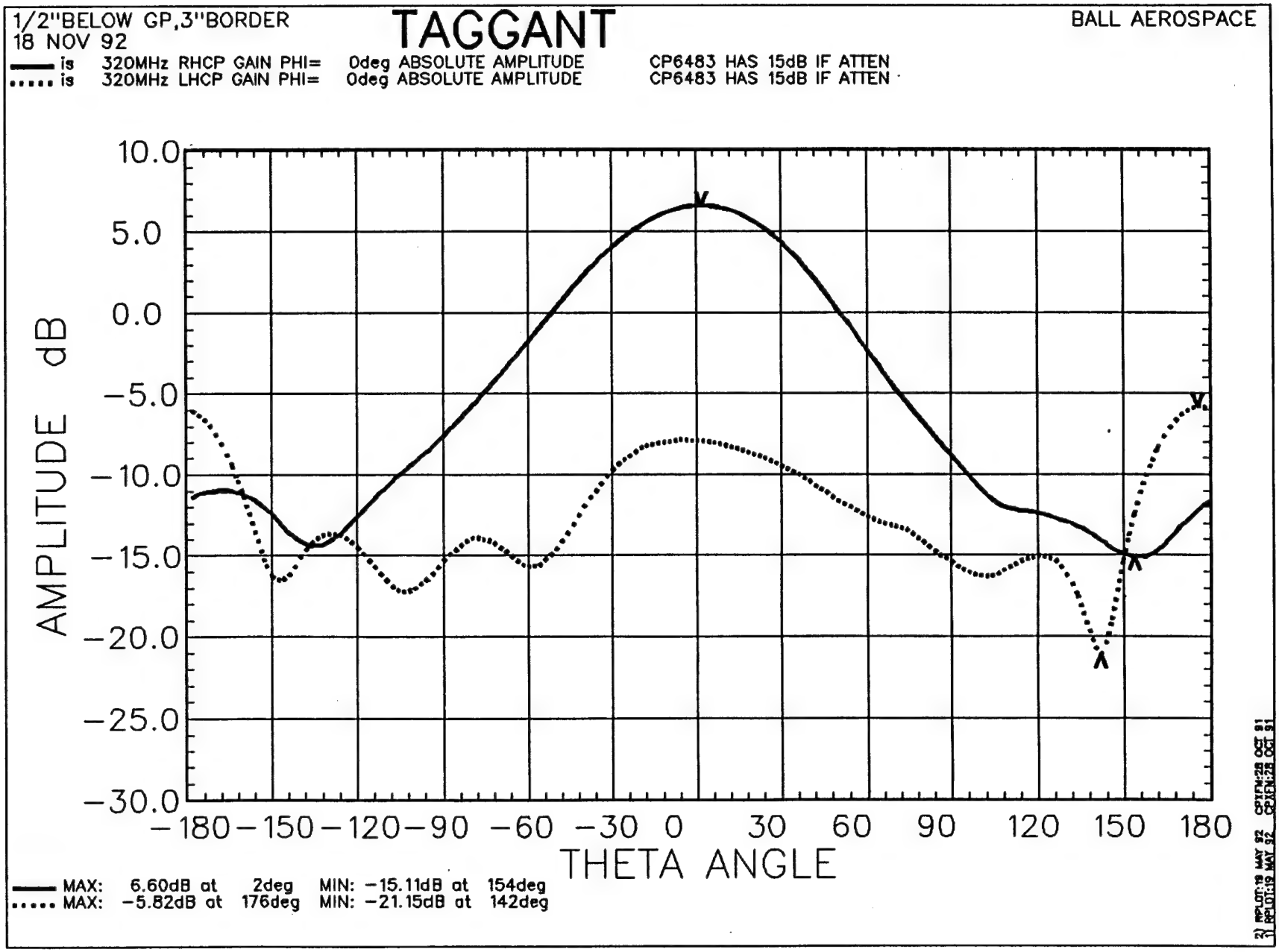
—— is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6481 HAS 15dB IF ATTEN
····· is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6481 HAS 15dB IF ATTEN

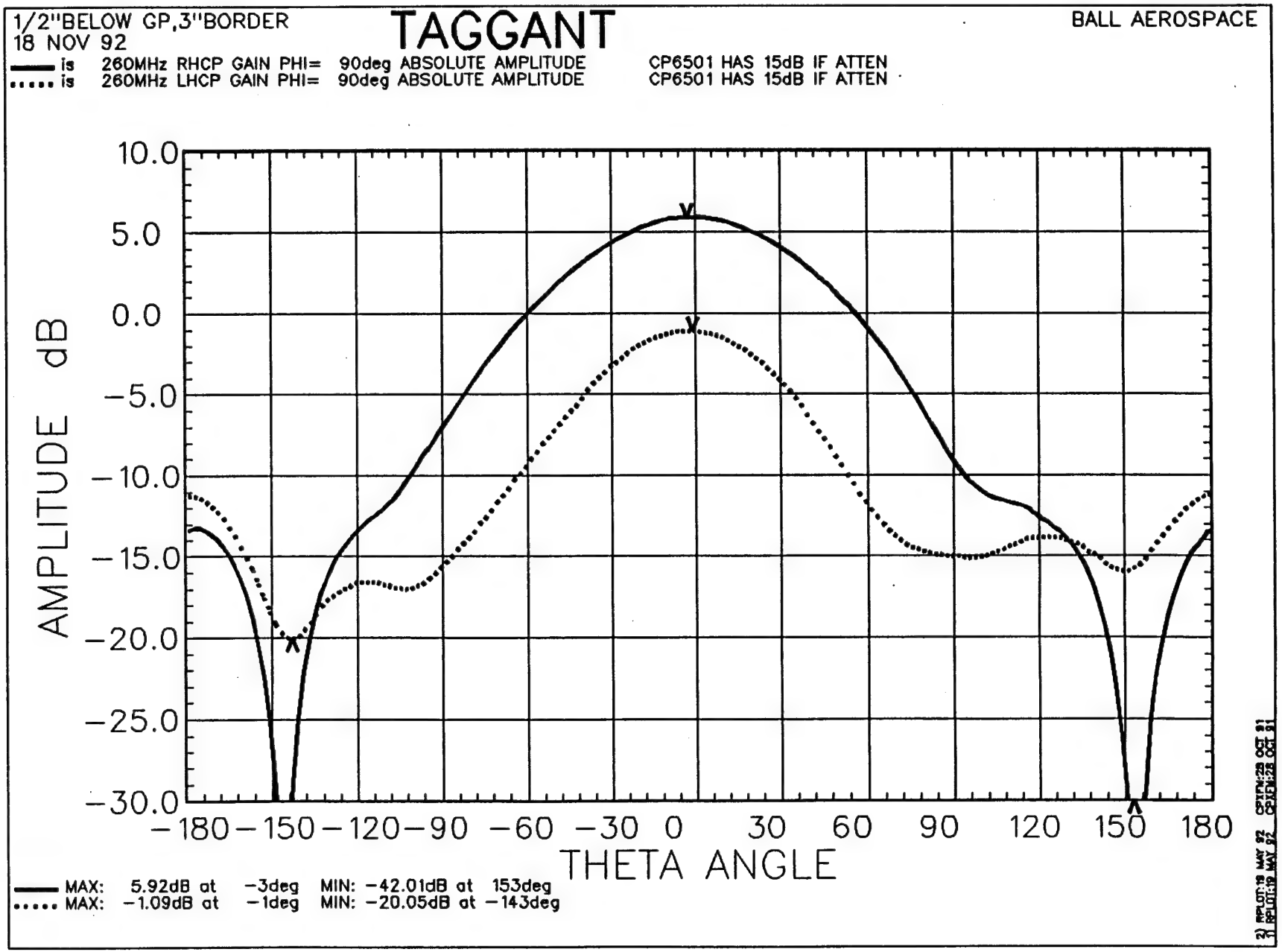


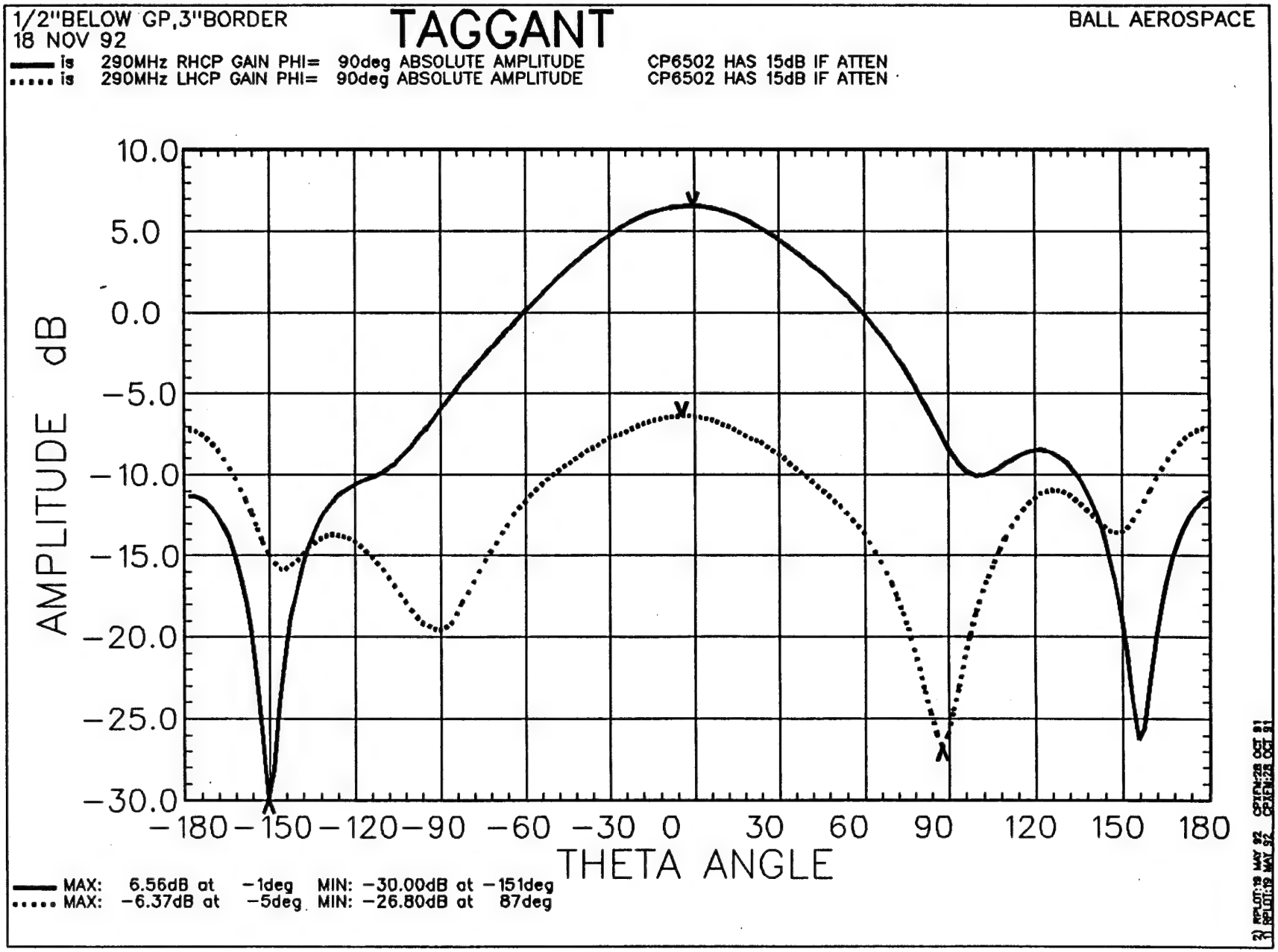
—— MAX: 5.74dB at 1deg MIN: −16.63dB at 147deg
····· MAX: −1.57dB at 9deg MIN: −38.71dB at −149deg

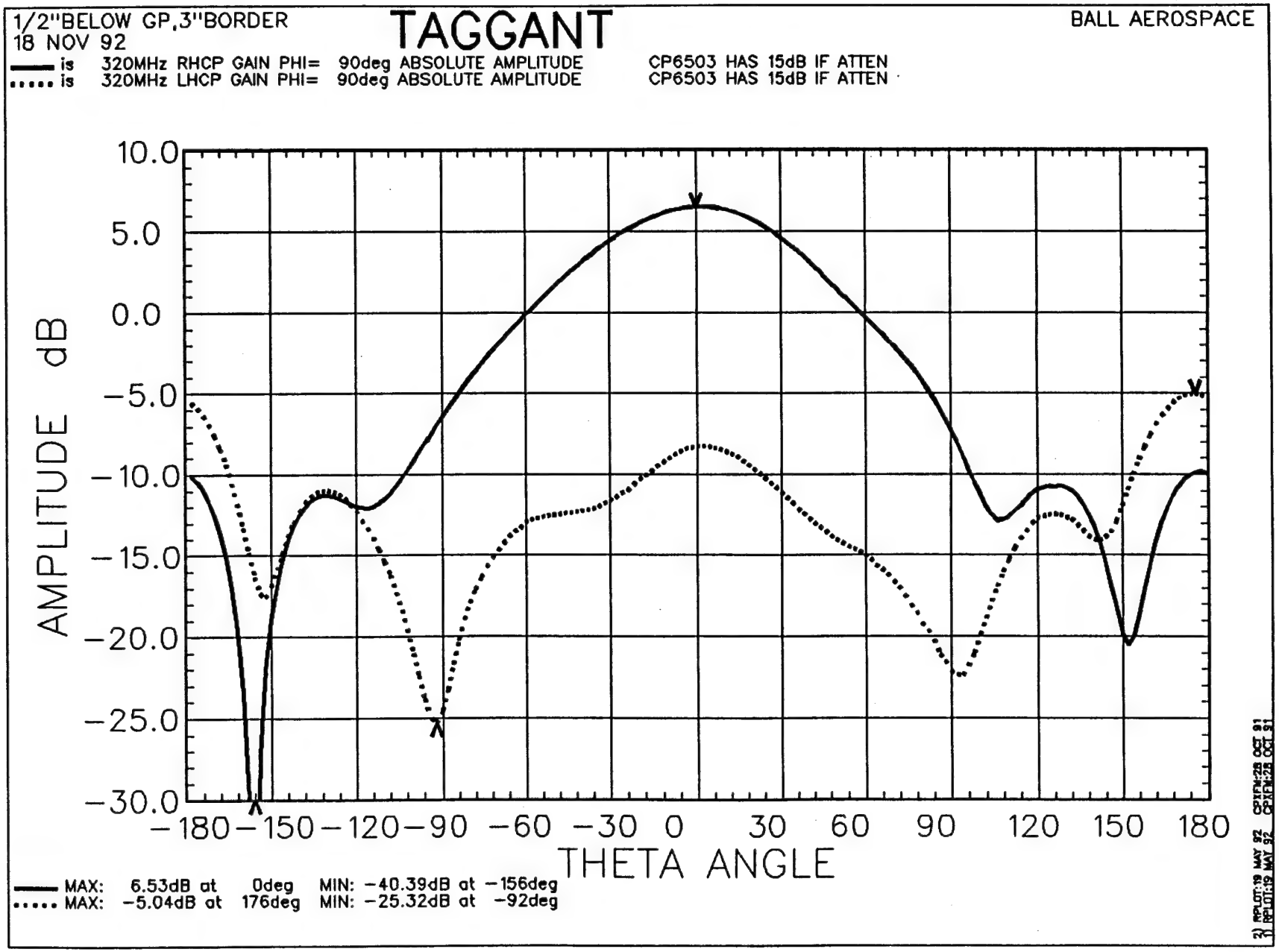
2) RPLOT:19 MAY 92 CP3TN:28 OCT 91
1) RPLOT:19 MAY 92 CP3TM:28 OCT 91

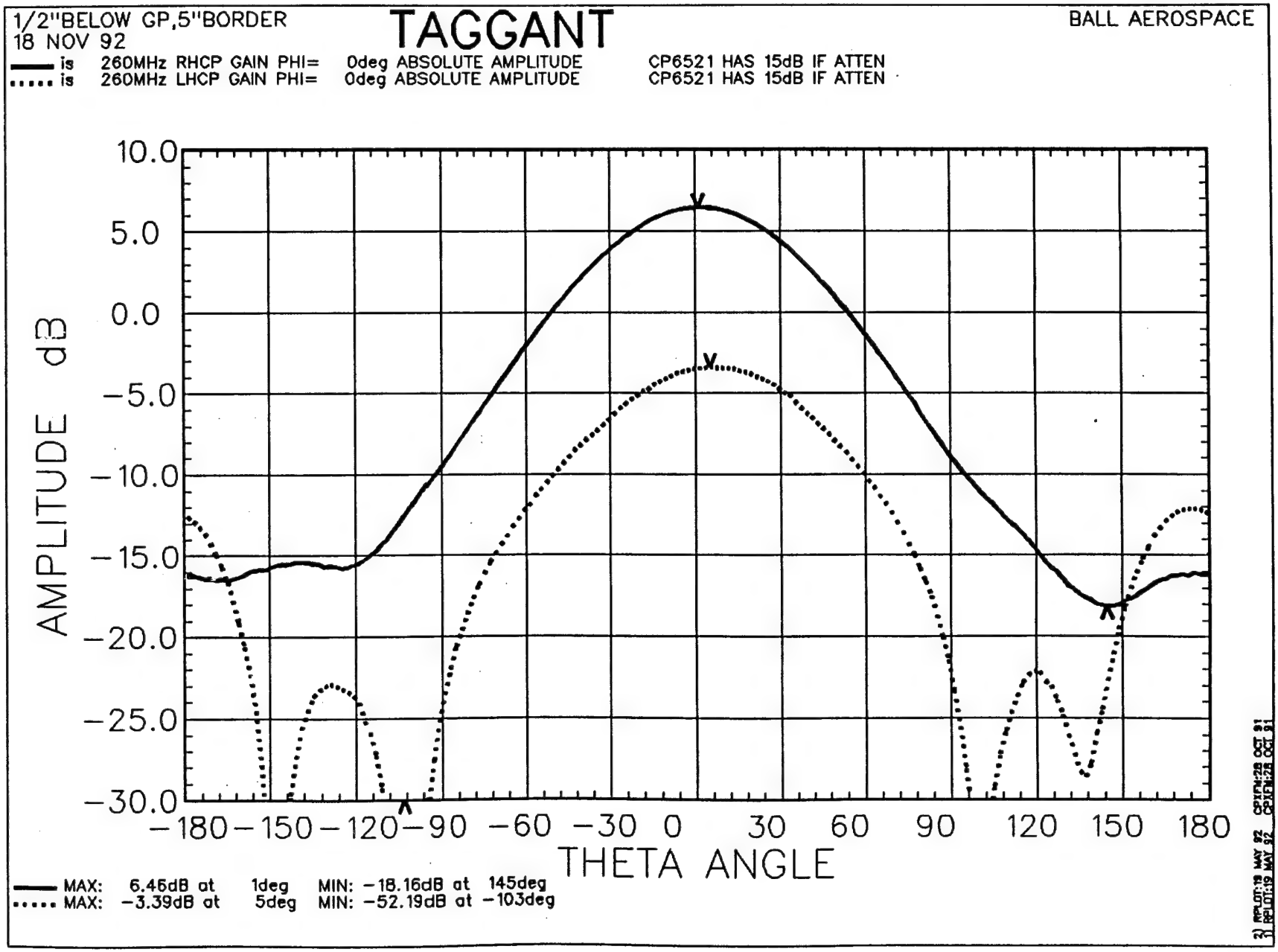

1/2"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6482 HAS 15dB IF ATTEN
is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6482 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.50dB at -1deg MIN: -16.37dB at 133deg
MAX: -6.89dB at 5deg MIN: -26.11dB at -141deg


1/2"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6483 HAS 15dB IF ATTEN
is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6483 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.60dB at 2deg MIN: -15.11dB at 154deg
MAX: -5.82dB at 176deg MIN: -21.15dB at 142deg


1/2"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6501 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6501 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 5.92dB at -3deg MIN: -42.01dB at 153deg
MAX: -1.09dB at -1deg MIN: -20.05dB at -143deg
2) RPLOT:19 MAY 92 CPTN:28 OCT 91
1) RPLOT:19 MAY 92 CPTN:28 OCT 91


1/2"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6502 HAS 15dB IF ATTEN
is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6502 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.56dB at -1deg MIN: -30.00dB at -151deg
MAX: -6.37dB at -5deg MIN: -26.80dB at 87deg


1/2"BELOW GP,3"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE
CP6503 HAS 15dB IF ATTEN
CP6503 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.53dB at 0deg MIN: -40.39dB at -156deg
MAX: -5.04dB at 176deg MIN: -25.32dB at -92deg

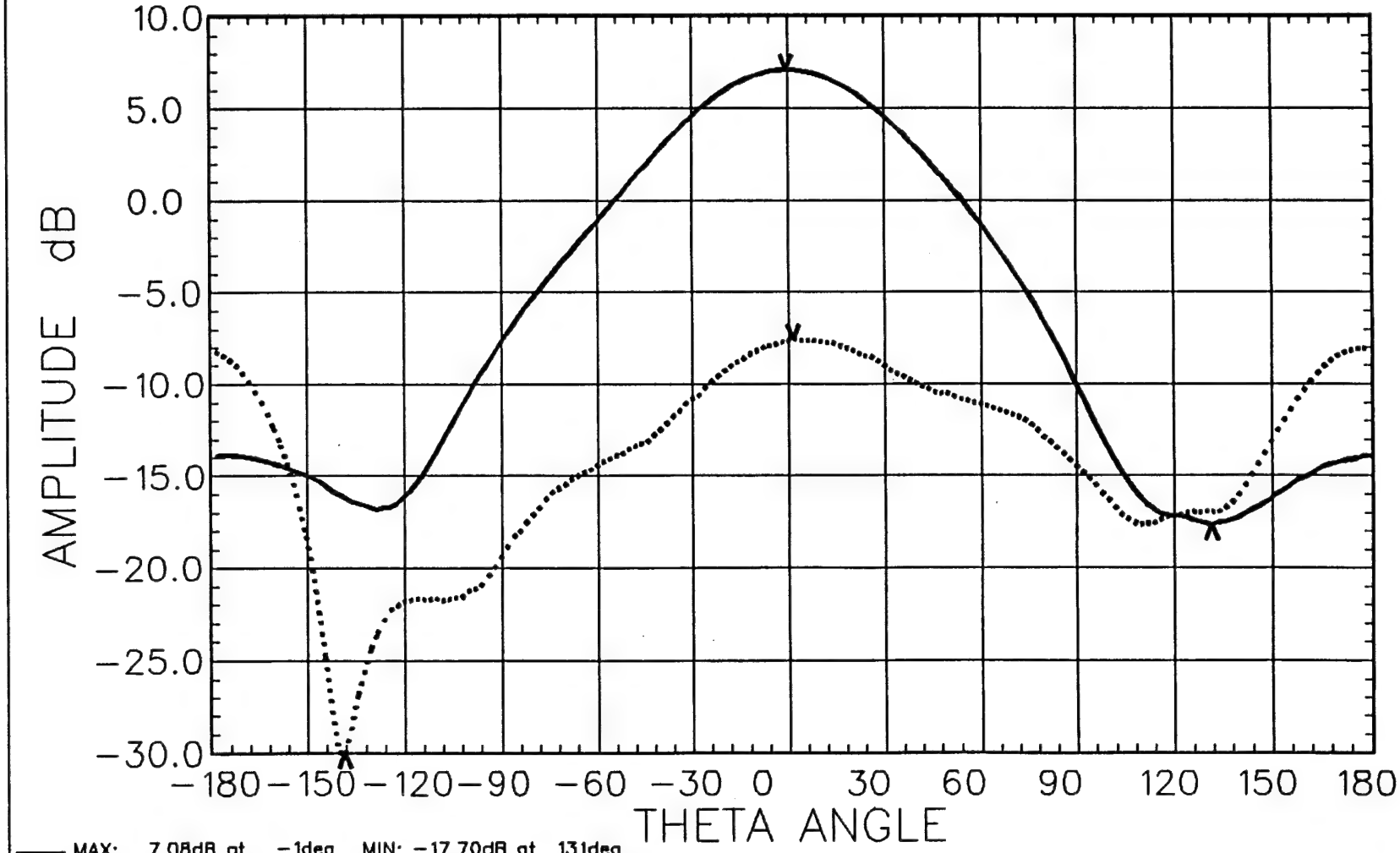

1/2"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6521 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6521 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.46dB at 1deg MIN: -18.16dB at 145deg
MAX: -3.39dB at 5deg MIN: -52.19dB at -103deg

1/2"BELOW GP,5"BORDER
18 NOV 92

TAGGANT

BALL AEROSPACE

—— is 290MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6522 HAS 15dB IF ATTEN
····· is 290MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6522 HAS 15dB IF ATTEN



—— MAX: 7.08dB at −1deg MIN: −17.70dB at 131deg
····· MAX: −7.60dB at 1deg MIN: −30.04dB at −139deg

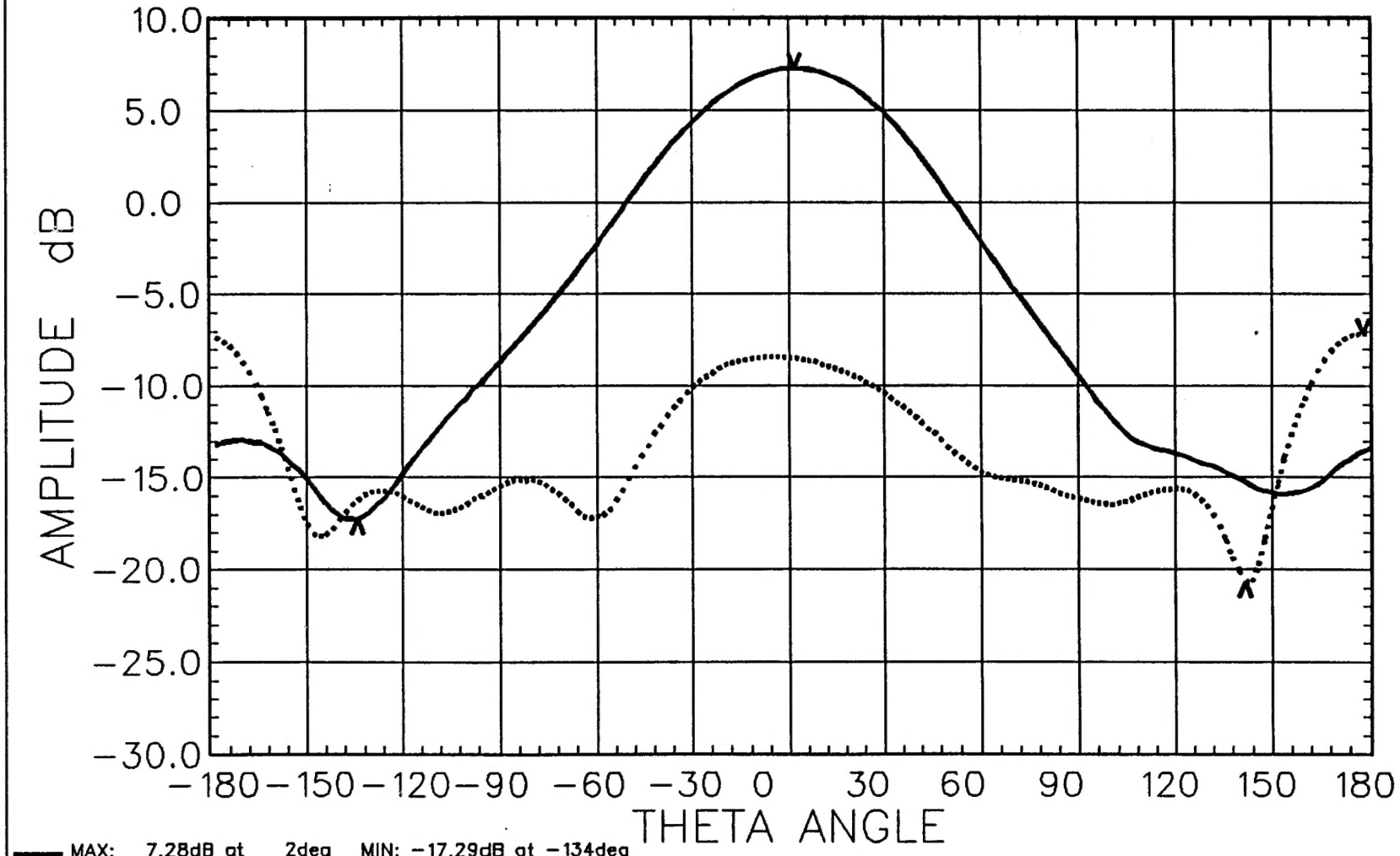
2) RPLOT:19 MAY 92 CPXM:28 OCT 91
1) RPLOT:19 MAY 92 CPXM:28 OCT 91

1/2"BELOW GP,5"BORDER
18 NOV 92

TAGGANT

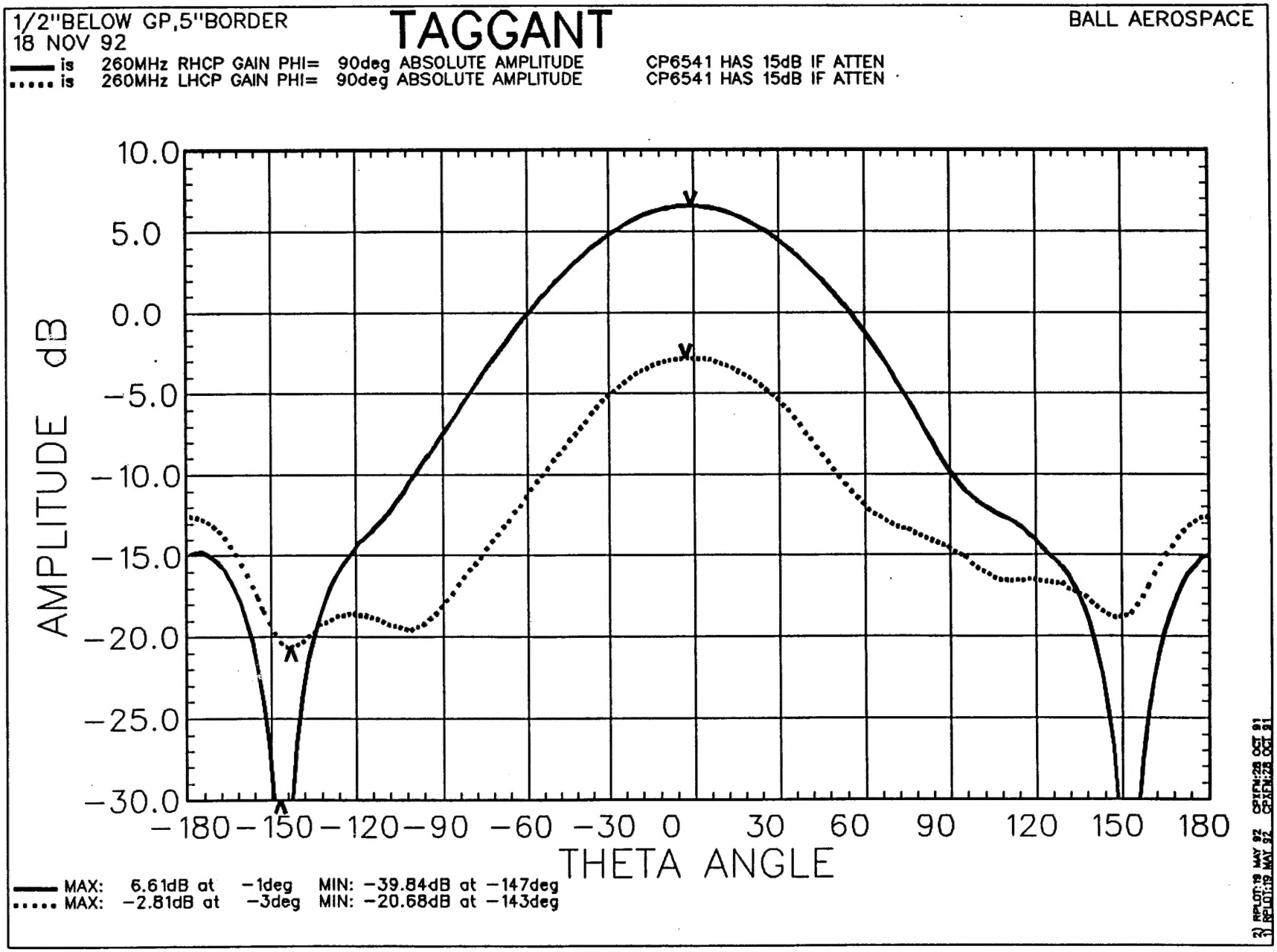
BALL AEROSPACE

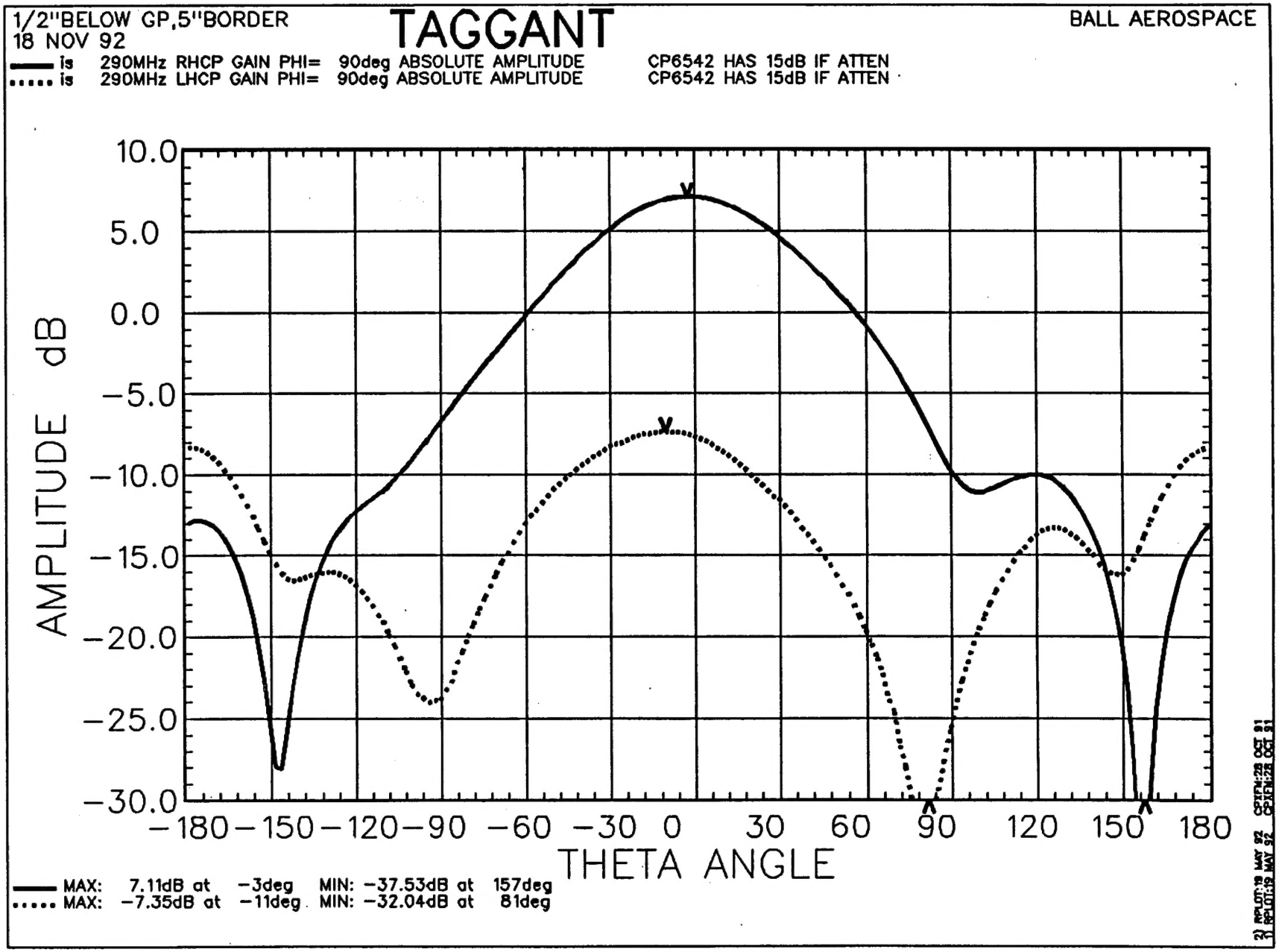
—— is 320MHz RHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6523 HAS 15dB IF ATTEN
····· is 320MHz LHCP GAIN PHI= 0deg ABSOLUTE AMPLITUDE CP6523 HAS 15dB IF ATTEN



—— MAX: 7.28dB at 2deg MIN: −17.29dB at −134deg
····· MAX: −7.16dB at 178deg MIN: −20.72dB at 142deg

2) RPLOT:19 MAY 92 CP1CH:28 OCT 91
1) RPLOT:19 MAY 92 CP1CH:28 OCT 91


1/2"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 260MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6541 HAS 15dB IF ATTEN
is 260MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6541 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 6.61dB at -1deg MIN: -39.84dB at -147deg
MAX: -2.81dB at -3deg MIN: -20.68dB at -143deg
2) RPLOT:19 MAY 92 CP1FN:28 OCT 91
3) RPLOT:19 MAY 92 CP2FN:28 OCT 91

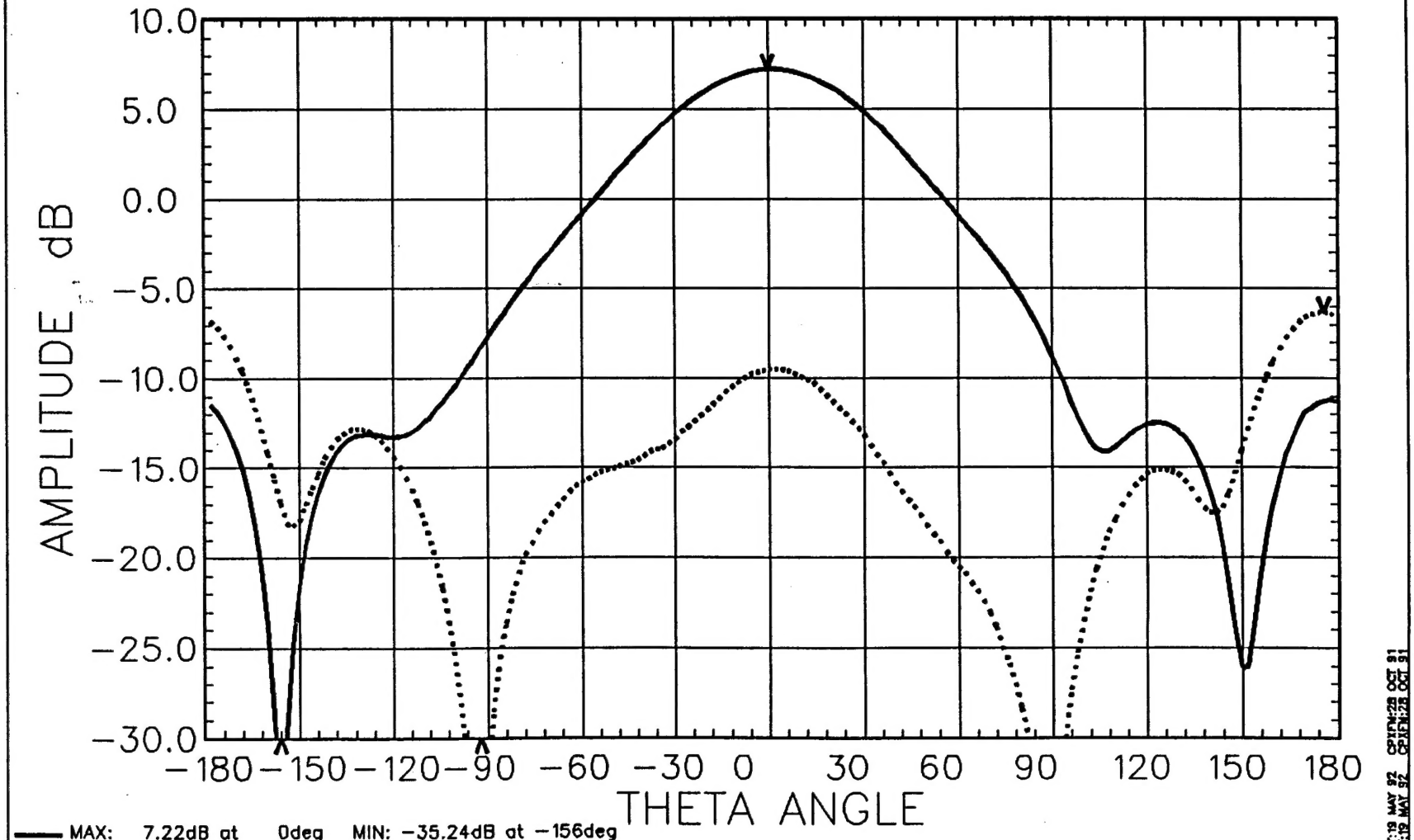

1/2"BELOW GP,5"BORDER
18 NOV 92
TAGGANT
BALL AEROSPACE
is 290MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6542 HAS 15dB IF ATTEN
is 290MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6542 HAS 15dB IF ATTEN
AMPLITUDE dB
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180
THETA ANGLE
MAX: 7.11dB at -3deg MIN: -37.53dB at 157deg
MAX: -7.35dB at -11deg MIN: -32.04dB at 81deg

1/2"BELOW GP,5"BORDER
18 NOV 92

TAGGANT

BALL AEROSPACE

—— is 320MHz RHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6543 HAS 15dB IF ATTEN
····· is 320MHz LHCP GAIN PHI= 90deg ABSOLUTE AMPLITUDE CP6543 HAS 15dB IF ATTEN



—— MAX: 7.22dB at 0deg MIN: −35.24dB at −156deg
····· MAX: −6.33dB at 176deg MIN: −39.72dB at −92deg

2) RPLOT:19 MAY 92 CP1FN:28 OCT 91
1) RPLOT:19 MAY 92 CP1FN:28 OCT 91